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SUPPLEMENT TO COMPARATIVE ECONOMIES OF DIFFERENT TYPES OF COTTONSEED OIL MILLS AND THEIR EFFECTS ON OIL SUPPLIES, PRICES, AND RETURNS TO GROWERS

Supplement to Marketing Research Report No. 54

54

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Marketing Research Division

PREFACE

The specifications, operating requirements, and technical explanations of the cottonseed oil mills (discussed in this supplement) were developed by the Engineering Experiment Station of Texas Agricultural and Mechanical College System, under a contract with the U. S. Department of Agriculture. S. P. Clark, associate research engineer of the Cottonseed Products Laboratory of the Experiment Station, was in charge of this work. John M. Brewster, agricultural economist, served as project leader in the study until October 1956, when he transferred from the Agricultural Marketing Service to the Agricultural Research Service, U. S. Department of Agriculture. During the first part of the project, Mr. Brewster supervised the contract, and made preliminary analyses and important contributions to the final report. C. B. Gilliland, head, Special Crops Section, Marketing Research Division, Agricultural Marketing Service, gave general direction and other assistance in planning and supervising the study and in organizing the material for the final report.

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SUPPLEMENT TO COMPARATIVE ECONOMIES OF DIFFERENT TYPES OF COTTONSEED OIL MILLS AND THEIR EFFECTS ON OIL SUPPLIES, PRICES, AND RETURNS TO GROWERS

(Supplement to Marketing Research Report No. 54)

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SUMMARY

This supplement to Marketing Research Report No. 54, "Comparative Economies of Different Types of Cottonseed Oil Mills and Their Effects on Oil Supplies, Prices, and Returns to Growers,"[1] adjusts 1949-50 cottonseed oil mill operating costs and product prices to 1955-56 levels. The economies of different types of completely new mills (hydraulic, high-speed screw-press, direct-solvent, and prepress-solvent) are compared in terms of net revenues per ton of seed processed on the basis of 1955-56 operating conditions for typical U. S. mills. The mills, which range in size from 40 to 400 tons of daily crushing capacity, are compared at 9 specified volumes of seed representing annual crushes ranging from 10,600 to 105,600 tons. The effects of mill economies on oil supplies, prices, and returns to growers are not considered.

The analysis showed that different types of mills were the most profitable at different annual crushes. At 10,600 tons, the screw-press mill was found to be the most profitable type. The direct-solvent was most profitable at annual crushes of 13,200, 26,400, 52,800, and 79,200 tons; while the prepress-solvent mill was the most profitable at 21,100, 42,200, 63,400, and 105,600 tons. At annual crushes of 13,200 and 26,400 tons, the screw-press mill was more profitable than the prepress-solvent type. Hydraulic mills showed the lowest net revenue per ton for all crushes, and at 10,600 tons showed a loss. For a given annual crush, when both direct-solvent and prepress-solvent mills made more net revenue than the screw-press, the more profitable of the 2 types was usually the one that operated the longer season. Thus, the type of solvent mill that used the larger percentage of its annual capacity made the bigger net revenue.

Net revenues per ton of seed increased for all types of mills as the annual crush became larger. For annual crushes from 10,600 to 105,600 tons, net revenues per ton of seed ranged from a loss of $1.73 to a revenue of $7.85 for hydraulic mills; from $1.88 to $11.20 per ton for screw-press mills; from $1.57 to $12.34 for direct-solvent mills, and from $1.01 to $12.38 for prepress-solvent mills.

Total revenues from sale of cottonseed products (oil, meal, linters, and hulls) were estimated at $86.94 per ton of seed for prepress-solvent mills, $86.33 for direct-solvent, and $81.32 for hydraulic mills. Total revenues for screw-press mills varied with throughput (amount of seed crushed) per press per day, and ranged from $83.47 to $84.43 for throughputs from 50 down to 30 tons. Differences in total revenue are due mainly to differences in oil yields. Linters and meal yields were the same for all types of mills and, although hull yields varied, the differences in hull revenues were minor. In calculating these revenues, it was assumed that the price received for cottonseed meal would be the same regardless of the oil-extraction method employed.

Processing costs (total cost minus seed cost) per ton of seed decreased for all types of mills as the size of annual crush increased. The prepress-solvent type had the highest costs, and the screw-press the lowest. From 10,600 to 105,600 tons, processing costs

[1] By John M. Brewster. Issued by the U. S. Department of Agriculture in February 1954. Hereafter in this supplement the report is frequently referred to as MRR No. 54.

decreased from $33.43 to $22.06 per ton for prepress-solvent mills; from $32.26 to $21.49 for direct-solvent mills; from $30.56 to $20.97 for hydraulic mills; and from $29.68 to $20.73 for screw-press mills. About 90 percent of the savings in processing costs from the smallest to the largest annual crush was realized at about 53,000 tons for all types of mills.

The conclusions regarding the most profitable mill in this report differ from those based on 1949-50 data. In the previous study, the prepress-solvent mill was found to be the most profitable type for all the specified crushes, and the direct-solvent mill ranked second. There are 2 reasons for the differences in the 2 periods. First, improvements made in the screw-press and direct-solvent processes have resulted in higher oil yields per ton of seed, and thus the advantage of higher oil revenue from the prepress-solvent mill has been lessened. Second, cost increases for different annual crushes ranged from 5 to 7 percent higher for prepress-solvent mills than for screw-press, and from 2 to 5 percent higher for prepress-solvent than for direct-solvent mills. Thus, the higher increase in costs combined with the lowered advantage in oil revenue caused the prepress-solvent mill to lose its position as the most profitable type of mill at all the specified annual crushes. It held this position only when it operated at full capacity.

The conclusions of this study are subject to limitations. The findings might differ under cost-price relationships different from those used. If cost rates in a particular mill locality are higher or lower than those used, the cost relationships among the types of mills change correspondingly. Also, variations in product prices affect the relative profitability of mills. For example, it was assumed that all types of mills produced cottonseed products of the same form and quality, and also received the same product prices. However, if the meal market situation is such that mechanically processed meal receives a premium of at least $2.50 per ton over solvent-processed meal, as is the case in several mill localities, under the same other conditions assumed, the screw-press mill would be the most profitable type at all the specified crushes. The same principle is applicable to differences in cost rates. Thus, the comparative economies of the mills in this report are subject to these limitations.

THE OBJECTIVE

Marketing Research Report No. 54, "Comparative Economies of Different Types of Cottonseed Oil Mills and Their Effects on Oil Supplies, Prices, and Returns to Growers," was based on operating conditions and price data for 1949-50. Since then, prices have undergone a marked change. Also, pronounced improvements have been made in the screw-press type of oil-extraction process.

For these reasons, this report was prepared as a supplement to MRR No. 54 in the following 3 respects.

First, it adjusts to 1955-56 price levels the investment requirements of different types and sizes of new cottonseed oil mills ranging from 40 to 400 tons per day in size. In this adjustment, modern "high-speed" screw-press mills have been substituted for the older "low-speed" screw-press mills that have almost lost their identity, either through complete conversion to modern screw presses or through modifications of old equipment that have speeded up throughputs per screw press per day and also reduced the residual oil in cottonseed meal.

Second, this supplement adjusts to current levels the prices of operating requirements and cottonseed products (oil, meal, linters, and hulls).

Third, the economic characteristics representative of the cottonseed oil mill industry as a whole are used. The analysis is in terms of 1 mill area rather than 6 areas, as in MRR No. 54. The differences associated with areas which are standarized in terms of typical U. S. mills are investment requirements, seed availability and quality, cost rates, form of meal produced, and meal and hull market patterns.

Through the information described, this supplement compares the efficiencies of different types of mills for specified annual crushes in terms of their net revenues per ton of seed.

Much detailed information is required in building up expected investment requirements for different types and sizes of mills. However, in making economic comparisons of different mills, only total investments are needed as a basis for calculating fixed annual charges on buildings and on equipment. For these reasons, the first part of this supplement is concerned with the economic analysis of mills, while their investment requirements are described in the appendix in terms of 1955-56 prices of equipment, materials, and construction.

SPECIFICATIONS OF MILLS AND ANNUAL CRUSHES

Table 1 shows the annual crushes used in making economic comparisons of different mills. The reasons for selecting these particular crushes are set forth on pages 3 to 5 of MRR No. 54. Using net revenue per ton of seed as the measure of efficiency, that report worked out the most economical sizes of hydraulic, low-speed screw-press, direct-solvent, and prepress-solvent mills, for each of these crushes, in terms of 1949-50 operating-season prices. All these mills are shown in table 1, except that modern screw-press units have been substituted for the older low-speed screw-press mills.

For each of the annual crushes specified in table 1, it is assumed that the sizes (tons processed per day) of hydraulic and solvent mills shown are approximately the most economical (in terms of net revenue per ton of seed) under current conditions. This assumption is based on the fact that, in the 1949-50 analysis, the most profitable size of mill of each type was generally the mill that had the least cost in each of the 6 widely separated mill areas. Cost rates varied widely among these areas. For example, wage rates varied from $0.76 per hour in Mill Area I (southeastern North Carolina) to $1.50 per hour in Mill Area VI (central California). Therefore, the size of mill of each type shown to be most profitable under such varying cost-rate conditions was assumed to hold this same position under 1955-56 cost relationships.

In line with this assumption, the sizes, in terms of tons crushed per day, shown for modern high-speed screw-press mills are the same as those of the most economical size of low-speed screw-press mills for the specified annual crushes. The number of presses is smaller, however, because the modern process requires fewer presses to handle the same daily tonnage. Modern screw presses are capable of operating over a wide range of rates per press, no rate within this range being any more "normal" than any other. The range used in this supplement is from 30 to 50 tons per day. Under this condition, alternative numbers of presses are possible for any given overall mill capacity of 90 tons per day or more. A 100-ton mill, for example, may be installed with either 2 presses, each operating at 50 tons per day, or 3 presses, each operating at 33 1/3 tons. Because of a lower throughput per press, the 3-press mill crushing 100 tons per day will yield more oil, and hence a greater total revenue per ton of seed, than a 2-press mill crushing 100 tons per day, but it will also use more electric power. [2] Also, higher fixed annual charges will result because of the larger number of presses, involving higher investment. The same principle applies to other mills.

The question thus arises as to what is the most economical number of screw presses for a given daily capacity for each of the specified annual crushes. It was found that the largest number of presses--handling at least 30 tons per press per day--is the most economical, that is will yield the greatest net revenue per ton of seed. This is true because the increase in oil revenue is more than enough to offset the increase in fixed charges and electric power costs. For example, a 400-ton daily crush can be processed by an 8-, 9-, 10-, 11-, 12-, or 13-press mill, with throughputs per press ranging

[2] Brewster, John M., Conversion of Small Hydraulic Cottonseed Oil Mills into Higher Oil-Yielding Mills. U. S. Dept. Agr., Agr. Mktg. Serv., Mktg. Res. Rept. No. 187. 73 pp., illus. 1957.

from 50 down to 31 tons per day. For an 8-press mill, fixed charges and electric power costs were estimated at 36 cents per ton less than for a 13-press mill. However, the 13-press mill, with an increased oil yield of 7.6 pounds per ton, was estimated to have about 96 cents more total revenue, and, thus, about 60 cents more net revenue per ton of seed processed. Therefore, only the largest number of screw presses handling at least 30 tons per press per day has been specified for each of the annual crushes shown in table 1.

TABLE 1.--DAILY CRUSHING CAPACITIES AND LENGTHS OF OPERATING SEASONS FOR DIFFERENT COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY

Type of plant[1]	Crushing capacity per 24 hours	Length of operating season	
		Months	24-hour working days
	Tons	*Number*	*Number*
ANNUAL CRUSH: 10,600 TONS			
Prepress-solvent: Plant 2	80	6.0	132
Direct-solvent: Plant 1	50	9.6	211
Screw-press: 2-press	75	6.4	141
Hydraulic: 6-press	60	8.0	176
ANNUAL CRUSH: 13,200 TONS			
Direct-solvent: Plant 1	50	12.0	264
Prepress-solvent: Plant 2	80	7.5	165
Screw-press: 2-press	75	8.0	176
Hydraulic: 8-press	80	7.5	165
ANNUAL CRUSH: 21,100 TONS			
Prepress-solvent: Plant 2	80	12.0	264
Direct-solvent: Plant 2	100	9.6	211
Screw-press: 3-press	100	9.6	211
Hydraulic: 8-press	80	12.0	264
ANNUAL CRUSH: 26,400 TONS			
Direct-solvent: Plant 2	100	12.0	264
Prepress-solvent: Plant 3	160	7.5	165
Screw-press: 3-press	100	12.0	264
Hydraulic: 10-press	100	12.0	264
ANNUAL CRUSH: 42,200 TONS			
Prepress-solvent: Plant 3	160	12.0	264
Direct-solvent: Plant 3	200	9.6	211
Screw-press: 5-press	175	11.0	242
Hydraulic: 16-press	160	12.0	264

See footnote at end of table.

Continued

TABLE 1.--DAILY CRUSHING CAPACITIES AND LENGTHS OF OPERATING SEASONS FOR DIFFERENT COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY--Continued

Type of plant[1]	Crushing capacity per 24 hours	Length of operating season	
		Months	24-hour working days
	Tons	*Number*	*Number*
ANNUAL CRUSH: 52,800 TONS			
Direct-solvent: Plant 3	200	12.0	264
Prepress-solvent: Plant 4	240	10.0	220
Screw-press: 6-press	200	12.0	264
Hydraulic: 20-press	200	12.0	264
ANNUAL CRUSH: 63,400 TONS			
Prepress-solvent: Plant 4	240	12.0	264
Direct-solvent: Plant 4	300	9.6	211
Screw-press: 8-press	250	11.5	253
Hydraulic: 24-press	240	12.0	264
ANNUAL CRUSH: 79,200 TONS			
Direct-solvent: Plant 4	300	12.0	264
Prepress-solvent: Plant 5	400	9.0	198
Screw-press: 10-press	300	12.0	264
Hydraulic: 30-press	300	12.0	264
ANNUAL CRUSH: 105,600 TONS			
Direct-solvent: Plant 5	400	12.0	264
Prepress-solvent: Plant 5	400	12.0	264
Screw-press: 13-press	400	12.0	264
Hydraulic: 40-press	400	12.0	264

[1]Prepress-solvent and direct-solvent plants are arbitrarily assigned plant numbers 1 through 5 as an indication of plant sizes (tons processed per 24 hours).

COTTONSEED PRODUCT YIELDS AND REVENUES

Cottonseed product yields (oil, meal, linters, and hulls) and revenues are estimated on the basis that all mills process cottonseed of the same quality, and receive the same price per unit of products.

Product Yields

Cottonseed product yields by type of mill and throughput per screw press are shown in table 2. Average content of U. S. cottonseed for the 3-year period 1953-55, used for estimating oil, meal, and hull yields, are as follows:[3]

[3] Cottonseed Quality in the United States, 1953-54 and 1954-55. U. S. Dept. Agr., Agr. Mktg. Serv., 1956 and 1957.

Oil ----------18.6 percent
Ammonia ---------- 4.03 percent
Moisture----------9.4 percent

Oil yield per ton of seed for each process was estimated to be equivalent to the total oil in the seed, 372 pounds, minus (1) the oil left in the meal and (2) 4 pounds of oil left in the hulls and linters. Residual oil in meal for hydraulic mills was estimated at 5.2 percent of the weight of the meal, the 1953-54 season average for 32 hydraulic mills.[4] Direct-solvent and prepress-solvent mills can usually achieve a residual oil of 1.0 and 0.5 percent, respectively. In screw-press mills, the percentage of residual oil in meal varies with the throughput per screw press. (See footnote 2, page 3.) These percentages for screw presses are shown in table 2. Seed containing 4.03 percent ammonia yields 947 pounds of 41 percent protein meal. Therefore, residual oil in meal amounts to 49.2 pounds for hydraulic mills, 9.5 pounds for direct-solvent, and 4.7 pounds for prepress-solvent.

The linters yield of 184 pounds per ton of seed is the 3-year U. S. average for 1953-55.[5]

Yield of hulls per ton of seed (table 2) was estimated by subtracting from 2,000 pounds the combined yield of oil, meal, and linters, plus working loss. In calculating working loss, it was assumed that, on the average, 7 percent of the weight of all products would be moisture. Therefore, cottonseed with 9.4 percent moisture would have an excess of 2.4 percent, so that 48 pounds of moisture per ton of seed would be lost in working the seed.

TABLE 2.--ESTIMATED COTTONSEED PRODUCT YIELDS PER TON OF SEED PROCESSED, BY TYPE OF MILL AND THROUGHPUT PER SCREW PRESS, 1955-56

Type of mill and throughput per screw press	Residual oil in meal		Product yields[1]			
	Percentage	Quantity[2]	Oil	Meal	Linters	Hulls
	Percent	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Hydraulic	5.2	49.2	318.8	947.0	184.0	502.2
Direct-solvent	1.0	9.5	358.5	947.0	184.0	462.5
Prepress-solvent	.5	4.7	363.3	947.0	184.0	457.7
Screw-press:						
30.00 tons	2.6	24.6	343.4	947.0	184.0	477.6
30.77 tons	2.6	24.6	343.4	947.0	184.0	477.6
31.25 tons	2.6	24.6	343.4	947.0	184.0	477.6
33.33 tons	2.7	25.6	342.4	947.0	184.0	478.6
35.00 tons	2.8	26.5	341.5	947.0	184.0	479.5
35.71 tons	2.8	26.5	341.5	947.0	184.0	479.5
36.36 tons	2.9	27.5	340.5	947.0	184.0	480.5
37.50 tons	2.9	27.5	340.5	947.0	184.0	480.5
40.00 tons	3.0	28.4	339.6	947.0	184.0	481.4
41.67 tons	3.1	29.4	338.6	947.0	184.0	482.4
42.86 tons	3.1	29.4	338.6	947.0	184.0	482.4
43.75 tons	3.2	30.3	337.7	947.0	184.0	483.3
44.44 tons	3.2	30.3	337.7	947.0	184.0	483.3
50.00 tons	3.4	32.2	335.8	947.0	184.0	485.2

[1]Total yield of products per ton of seed processed equals 1,952 pounds, or 2,000 pounds minus 48 pounds lost in working the seed.
[2]Based on a yield of 947 pounds of meal per ton of seed.

[4]Mitchell, Julia A., Jackson, Donald, and Gilliland, C. B., Labor and Power Utilization at Cottonseed Oil Mills. U. S. Dept. Agr., AMS, Mktg. Res. Rept. No. 218, illus. 1958.
[5]Cotton Production and Distribution. Bur. Census Bul. No. 193. 1957.

Product Revenues

Cottonseed product revenues (table 3) were calculated by using the following 3-year (1953-55) average prices: (1) Oil price of 13.14 cents per pound of prime crude oil, f.o.b. Valley points; (2) meal price of $62.08 per ton, 41 percent protein, bagged-carlot, Memphis; (3) linters price of 4.03 cents per pound, weighted average price for all grades and market points, f.o.b. mills; and (4) hull price of $10.45 per ton, bulk, which is the Memphis quotation f.o.b. mills.

Meal and hull marketing practices were assumed to be the same for all types and sizes of mills. It was assumed that all meal was bagged and sold wholesale, and that all hulls were sold wholesale. Thus, there would be no difference in meal and hull revenue among mills due to varying marketing patterns, as there was in MRR No. 54.

The only difference in oil revenue among mills is also due to differences in yields. In MRR No. 54, the effect of length of operating season on grade of oil produced was estimated. This was done because the free fatty acid content of seed tends to increase somewhat with the time the seed remains in storage before processing. Thus mills operating for long seasons produce oil lower in grade, and hence price, than mills operating shorter seasons. This effect is ignored in the present study. All mills are assumed to produce prime-quality oil, and therefore to receive the same price per pound of oil. Differences in quality of oil produced by different processes is not considered, because available data are not conclusive.

Total product revenues per ton of seed were $81.32 for hydraulic, $86.33 for direct-solvent, and $86.94 for prepress-solvent mills. For screw-press mills, total revenue ranged from $83.47 per ton of seed for a throughput of 50 tons per press per day to $84.43 per ton for a throughput of 30 tons. Oil revenue accounted for over half of the total revenue for all mills.

TABLE 3.--ESTIMATED COTTONSEED OIL MILL REVENUE PER TON OF SEED PROCESSED, BY TYPE OF MILL AND THROUGHPUT PER SCREW PRESS, 1955-56

Type of mill and throughput per screw press per day	Oil	Meal[1]	Linters	Hulls	Total[1]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic	41.890	29.395	7.415	2.624	81.324
Direct-solvent	47.107	29.395	7.415	2.417	86.334
Prepress-solvent	47.738	29.395	7.415	2.391	86.939
Screw-press:					
30.00 tons	45.123	29.395	7.415	2.495	84.428
30.77 tons	45.123	29.395	7.415	2.495	84.428
31.25 tons	45.123	29.395	7.415	2.495	84.428
33.33 tons	44.991	29.395	7.415	2.501	84.302
35.00 tons	44.873	29.395	7.415	2.505	84.188
35.71 tons	44.873	29.395	7.415	2.505	84.188
36.36 tons	44.742	29.395	7.415	2.511	84.063
37.50 tons	44.742	29.395	7.415	2.511	84.063
40.00 tons	44.623	29.395	7.415	2.515	83.948
41.67 tons	44.492	29.395	7.415	2.521	83.823
42.86 tons	44.492	29.395	7.415	2.521	83.823
43.75 tons	44.374	29.395	7.415	2.525	83.709
44.44 tons	44.374	29.395	7.415	2.525	83.709
50.00 tons	44.124	29.395	7.415	2.535	83.469

[1] If solvent meal is discounted, meal revenue and total revenue for direct-and prepress-solvent mills, are less than shown.

OPERATING REQUIREMENTS AND COSTS

Mill operating requirements used to calculate total costs are, with few exceptions, the same as those reported in MRR No. 54. Detailed discussion is included in this supplement only for those requirements which are changed, or which are standardized for 1 instead of 6 mill areas. Costs are raised to 1955-56 levels by use of indexes, or by estimates of actual prevailing costs.

Plant Investment and Fixed Charges on Investment

Total plant investment requirements by departments are shown in table 4 for the specific mills analyzed. Breakdowns of these totals into costs of machinery, equipment, buildings, and other facilities are shown in detail in tables 22 through 62 in the appendix.

Fixed charges on investment, or plant costs, shown in table 4, include depreciation, interest, taxes, and insurance.

Depreciation rates are the same as those used in MRR No. 54, and average between 3 and 4 percent of total investment for all mills.

Interest was charged at the rate of 5 percent on the entire initial investment for each mill, as compared to a rate of 4 percent used for 1949-50. (During the 1957-58 year, interest rates have fluctuated but they are still closer to 5 percent than 4 percent.)

Property tax rates used in the 1949-50 analysis differed for the 6 mill areas. These 6 rates were averaged and the calculated rate of $1.48 per $100 of assessed value was used. The assessed value is here equal to total investment.

Insurance rates used are the same as those reported in MRR No. 54, table 62, page 109.

Seed Procurement

Seed procurement costs shown in table 5 include purchase cost of seed f.o.b. gins, seed buyer costs, and a hauling charge for trucking seed from gins to mills.

Data were not available on the actual prices paid by oil mills to gins for cottonseed. "The handling of cottonseed by cotton gins is closely tied in with rendering the ginning service. ..... Sometimes a part of the cost of cottonseed is in fact a ginning expense. Some gins buy cottonseed, at least for short periods, at prices higher than the seed can be resold."[6] Therefore, the purchase cost of seed f.o.b. gins was estimated at $52.50 per ton, the 1953-55 U. S. average price received by farmers for seed.

Seed buyer cost, estimated at $0.532 per ton, was calculated by adjusting the cost used in the 1949-50 analysis, $0.400 per ton, to the 1955-56 level. This increase of 33 percent was that shown by the Federal Reserve Bank of New York Index of Average Weekly Earnings of Clerical and Professional Workers.

In MRR No. 54, average haul distances and costs as related to size of crush were estimated for each of the 6 mill areas. Those estimated for Mill Area 1 (southeastern North Carolina) approximated the average for the 6 areas analyzed (see MRR No. 54, fig. 61, p. 113, and fig. 63, p. 115). This mill area was selected, therefore, as typical for the United States. Truck haul charges per ton of seed for 1949-50 in North Carolina, Alabama, and Texas were compared with those for 1955-56. The increase in charges amounted to approximately 20 percent for all distances. The seed haul costs shown in table 5, therefore, are the 1949-50 costs for Mill Area 1 increased by 20 percent.

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[6] Weaver, Otis T., and Fetrow, Ward W., Costs and Margins of Cooperative Cotton Gins. U. S. Dept. Agr., Bulletin 67, 1951.

TABLE 4.--TOTAL PLANT INVESTMENTS AND COSTS PER TON OF COTTONSEED PROCESSED FOR DIFFERENT TYPES AND SIZES OF MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

Type of mill	Seed crushed per 24 hours	Length of season	Total investment	Plant costs per ton				
				Interest	Depreciation	Taxes	Insurance	Total
	ANNUAL CRUSH: 10,600 TONS							
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	60	8.0	858,925	4.067	3.134	1.204	0.402	8.807
Screw-press: 2-press	75	6.4	872,213	4.130	3.210	1.222	.395	8.957
Direct-solvent: Plant 1	50	9.6	921,282	4.362	3.448	1.291	.497	9.598
Prepress-solvent: Plant 2	80	6.0	1,064,782	5.042	3.996	1.492	.577	11.107
	ANNUAL CRUSH: 13,200 TONS							
Hydraulic: 8-press	80	7.5	911,869	3.454	2.662	1.022	0.335	7.473
Screw-press: 2-press	75	8.0	904,082	3.425	2.635	1.014	.337	7.411
Direct-solvent: Plant 1	50	12.0	956,947	3.625	2.838	1.073	.419	7.955
Prepress-solvent: Plant 2	80	7.5	1,086,398	4.115	3.242	1.218	.475	9.050
	ANNUAL CRUSH: 21,100 TONS							
Hydraulic: 8-press	80	12.0	1,027,038	2.431	1.829	0.720	0.256	5.236
Screw-press: 3-press	100	9.6	1,100,910	2.606	1.981	.771	.262	5.620
Direct-solvent: Plant 2	100	9.6	1,210,021	2.865	2.227	.848	.330	6.270
Prepress-solvent: Plant 2	80	12.0	1,201,585	2.845	2.191	.842	.343	6.221
	ANNUAL CRUSH: 26,400 TONS							
Hydraulic: 10-press	100	12.0	1,151,764	2.181	1.636	0.646	0.227	4.690
Screw-press: 3-press	100	12.0	1,154,871	2.187	1.643	.647	.227	4.704
Direct-solvent: Plant 2	100	12.0	1,263,992	2.394	1.840	.709	.281	5.224
Prepress-solvent: Plant 3	160	7.5	1,559,364	2.953	2.303	.874	.341	6.471
	ANNUAL CRUSH: 42,200 TONS							
Hydraulic: 16-press	160	12.0	1,614,092	1.911	1.422	0.566	0.202	4.101
Screw-press: 5-press	175	11.0	1,666,351	1.972	1.478	.584	.204	4.238
Direct-solvent: Plant 3	200	9.6	1,784,324	2.112	1.617	.625	.241	4.595
Prepress-solvent: Plant 3	160	12.0	1,766,502	2.091	1.585	.619	.254	4.549
	ANNUAL CRUSH: 52,800 TONS							
Hydraulic: 20-press	200	12.0	1,882,354	1.783	1.321	0.528	0.187	3.819
Screw-press: 6-press	200	12.0	1,883,548	1.784	1.324	.528	.188	3.824
Direct-solvent: Plant 3	200	12.0	1,923,718	1.822	1.375	.539	.215	3.951
Prepress-solvent: Plant 4	240	10.0	2,211,621	2.094	1.593	.620	.247	4.554
	ANNUAL CRUSH: 63,400 TONS							
Hydraulic: 24-press	240	12.0	2,120,526	1.673	1.233	0.495	0.175	3.576
Screw-press: 8-press	250	11.5	2,207,043	1.742	1.288	.516	.179	3.725
Direct-solvent: Plant 4	300	9.6	2,424,223	1.913	1.451	.566	.218	4.148
Prepress-solvent: Plant 4	240	12.0	2,338,488	1.845	1.387	.546	.222	4.000
	ANNUAL CRUSH: 79,200 TONS							
Hydraulic: 30-press	300	12.0	2,742,150	1.731	1.275	0.512	0.181	3.699
Screw-press: 10-press	300	12.0	2,695,239	1.702	1.256	.504	.179	3.641
Direct-solvent: Plant 4	300	12.0	2,625,254	1.657	1.235	.491	.196	3.579
Prepress-solvent: Plant 5	400	9.0	3,139,684	1.982	1.500	.587	.228	4.297
	ANNUAL CRUSH: 105,600 TONS							
Hydraulic: 40-press	400	12.0	3,368,923	1.595	1.166	0.472	0.167	3.400
Screw-press: 13-press	400	12.0	3,346,187	1.584	1.160	.469	.166	3.379
Direct-solvent: Plant 5	400	12.0	3,178,443	1.505	1.111	.445	.178	3.239
Prepress-solvent: Plant 5	400	12.0	3,493,544	1.654	1.226	.490	.199	3.569

Salary, Office, and Travel and Auto Expense

In MRR No. 54, estimates of the salary, office, and travel and auto expenses were related to size of annual crush, based on data provided by the National Cottonseed Products Association. They were assumed to be the same for all types of mills. For 1955-56, salaries were increased by 33 percent, the increase shown by the Federal Reserve Bank

of New York Index of Average Weekly Earnings of Clerical and Professional Workers. Travel and auto expenses were increased by 16 percent, the increase shown by the Bureau of Labor Statistics Indexes on Transportation and Gasoline Costs. Office expenses remain unchanged from those used in MRR No. 54. These costs are shown in table 5 for the different crushes.

TABLE 5.--TOTAL CONSTANT COSTS PER TON OF COTTONSEED PROCESSED FOR ALL TYPES OF MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

Cost	Size of annual crush								
	10,600 tons	13,200 tons	21,100 tons	26,400 tons	42,200 tons	52,800 tons	63,400 tons	79,200 tons	105,600 tons
Seed procurement:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Seed, f.o.b. gins	52.530	52.530	52.530	52.530	52.530	52.530	52.530	52.530	52.530
Seed buyer	.532	.532	.532	.532	.532	.532	.532	.532	.532
Seed haul	2.892	2.940	3.120	3.204	3.468	3.696	3.852	4.104	4.524
Total	55.954	56.002	56.182	56.266	56.530	56.758	56.914	57.166	57.586
All other:									
Salaries	3.118	3.032	2.786	2.632	2.234	2.015	1.835	1.637	1.556
Office	.221	.213	.192	.180	.147	.129	.116	.102	.095
Travel and auto	.269	.262	.238	.223	.182	.159	.138	.114	.086
Linter-room expense	.268	.268	.268	.268	.268	.268	.268	.268	.268
Miscellaneous mill expense	.385	.385	.385	.385	.385	.385	.385	.385	.385
Linter bags and ties	.377	.377	.377	.377	.377	.377	.377	.377	.377
Meal bags	1.326	1.326	1.326	1.326	1.326	1.326	1.326	1.326	1.326
Lubricants and cleaning supplies	.075	.075	.075	.075	.075	.075	.075	.075	.075
Total	6.039	5.938	5.647	5.466	4.994	4.734	4.520	4.284	4.168
Total	61.993	61.940	61.829	61.732	61.524	61.492	61.434	61.450	61.754

Supplies

Items included in the supply category are (1) linter bagging and ties, (2) lubricants and cleaning materials, (3) meal bags, (4) press cloth and mending, (5) solvent, and (6) acidulated soapstocks. Costs per ton of seed for the first 3 items, which are used by all types of mills, are the same for all mills as shown in table 5. These 1955-56 costs are based on reports of mill operators. Linter bags were reported to average 9.5 cents per 100 pounds of linters, and linter ties 11 cents per 100 pounds of linters. This increase in cost of linter bagging and ties amounted to less than 5 percent; lubricants and cleaning materials averaged 7.5 cents per ton of seed, an increase of 50 percent over 1949-50. Meal bags were reported to cost $2.80 per ton of meal, almost a 40-percent decrease from 1949-50.

Press cloth and mending materials are used only by hydraulic mills. As reported by mill operators, the average cost was 13 cents per ton of seed (table 6).

TABLE 6.--TOTAL CONSTANT COSTS PER TON OF SEED PROCESSED FOR ALL SIZES OF CRUSH, BY TYPE OF MILL

Type of mill	Water	Fuel	Press cloth and mending	Hexane	Acidulated soapstock	Repairs	Total
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic	0.006	0.160	0.130	---	---	1.688	1.984
Screw-press	.014	.240	---	---	---	1.918	2.172
Direct-solvent	.080	.560	---	0.555	0.450	1.918	3.563
Prepress-solvent	.055	.400	---	.370	.675	1.948	3.448

The cost of hexane per ton of seed--hexane is used only by the solvent mills--is shown in table 6. These costs are based on a solvent loss of 3 gallons per ton of seed for direct-solvent mills, 2 gallons for prepress-solvent mills, and an average price of 18.5 cents per gallon.

Costs of soapstock per ton of seed for direct-solvent and prepress-solvent mills are shown in table 6. Because of its low fat content, solvent meal is dusty and difficult to pellet. Since the preparation of MRR No. 54, most solvent operators have met this difficulty by adding enough acidulated soapstock to bring the fat content of the meal up to 2 or 3 percent. Some mills add the soapstock to all meal as it comes from the solvent plant. Others add soapstock to meal before bagging or pelleting, different amounts being added to meal and pellets. This report assumes that enough soapstock would be added to bring the fat content up to 2 percent, which is sufficient to prevent dustiness and make the meal suitable for pelleting. Table 7 shows how the amounts added were calculated.

TABLE 7.--ESTIMATED COST OF ACIDULATED SOAPSTOCK USED BY DIRECT-SOLVENT AND PREPRESS-SOLVENT COTTONSEED OIL MILLS, 1955-56

Type of mill	Meal yield per ton of seed[1]	Residual oil in meal		Soapstock added to raise fat in meal to 2 percent	Cost of soapstock per ton of seed[2]
		Amount	Percent		
	Pounds	*Pounds*	*Percent*	*Pounds*	*Dollars*
Direct-solvent.....	947	9.47	1.0	9.47	0.450
Prepress-solvent.....	947	4.74	.5	14.20	.675

[1] Assuming production of 8.0 percent ammonia meal from cottonseed having 4.03 percent ammonia.

[2] Memphis brokers reported an average price of 4.75 cents per pound of acidulated soapstock delivered to mills, September 1955 through February 1956.

Mill Expense

The mill expense category includes repairs, linter-room upkeep, and miscellaneous mill expenses.

Repair cost is usually made up of 50 percent materials and 50 percent labor. Since cost of materials increased about 20 percent since 1949-50, and labor cost about 33 percent, the $1.35 per ton repair cost for 1949-50 was increased by 25 percent for hydraulic mills. Maintenance and repair cost on the oil-extraction equipment is about 23 cents per ton higher for screw-press and direct-solvent mills than for hydraulic, and 26 cents per ton higher for prepress-solvent mills. (See footnote 2, page 3.) Therefore, costs of repairs were estimated at $1.688 per ton of seed for hydraulic mills, $1.918 for screw-press and direct-solvent mills, and $1.948 for prepress-solvent mills (table 6).

Linter-room expense was estimated at 14.56 cents per 100 pounds of linters produced, as shown in table 8. This amount is about 10 percent less than that estimated for 1949-50. This cost per ton of seed is shown in table 5, and it is the same for all mills.

Miscellaneous mill expenses, which include such items as light bulbs, cleaning supplies, janitor work, brooms, and belts, for other parts of the mill than the linter room, were estimated at $0.385 per ton of seed for all types of mills (table 5).

TABLE 8.--COST OF LINTER-ROOM MAINTENANCE AND REPAIR EXPENSE PER 100 POUNDS OF LINTERS PRODUCED, 1955-56

Cost item	Expense[1]
	Cents
Linter saws	5.57
New bristle strip	1.85
File or gummer	1.14
Belts, brooms, and miscellaneous	6.00
Total	14.56

[1] Based on reports from manufacturers.

Fuel

As all mills described in this supplement were considered to be electrically powered, fuel was required only for generating steam needed in cooking cottonseed meats or desolventizing the oil and meal. Fuel oil was the only fuel considered, although natural gas and coal are used in some localities. No. 6 oil is cheaper than No. 3 oil, which was assumed in MRR No. 54. Accordingly, the boilers provided under revised boiler investment requirements, in table 52 of the appendix, allow the use of No. 6 fuel oil. A fuel-oil cost of 8 cents per gallon was used.

Fuel-oil requirements were estimated on the basis of steam and boiler horsepower hours per ton of seed (as shown) in MRR No. 54. Since then, new data make possible some refinements in these requirements for the hydraulic and screw-press processes, as indicated in table 9.

TABLE 9.--STEAM AND FUEL-OIL REQUIREMENTS AND COSTS PER TON OF COTTONSEED PROCESSED, BY TYPE OF MILL, 1955-56

Type of mill	Steam	Boiler horsepower-hours	Fuel oil (No. 6)	
			Requirement[1]	Cost[2]
	Pounds	*Number*	*Gallons*	*Dollars*
Hydraulic	230	6.7	2	0.160
Screw-press[3]	300	8.7	3	.240
Direct-solvent	760	22.0	7	.560
Prepress-solvent	550	15.9	5	.400

[1] Based on a boiler efficiency of 80 percent, a heat requirement of 1,100 B.t.u. per pound of steam, and 152,000 B.t.u. per gallon of No. 6 fuel oil.

[2] Based on 8 cents per gallon, as reported by oil producers and distributors. No. 6 fuel oil averaged 8 cents per gallon delivered in tank carlots at Memphis, September 1954 through August 1955.

[3] Applies to either the modern or the older low-speed screw-press mills.

For drying cottonseed meats from 12 to 3 percent moisture and heating them from 80° to 260° F., the calculated heat requirement is 233,460 British thermal units (B. t. u.) per ton of seed. With a recoverable heat of 857 B. t. u. per pound of steam, this is

equivalent to 260 pounds of steam. Adding 15 percent for losses and miscellaneous uses, the requirement is approximately 300 pounds per ton for screw-press processing either by the older low-speed or the modern screw-presses.

For drying meats from 11 to 5 percent moisture and heating them from 80° to 235° F., 172,420 B.t.u. per ton of seed are required. This is equivalent to 201 pounds of steam per ton. The drying range and temperature range may easily be greater than the ranges just specified. In line with these facts, this supplement assumed 230 pounds of steam per ton of seed for hydraulic processing instead of the 205 pounds used in MRR No. 54. (Some authors use a somewhat higher figure. For example, Hunt Moore, in the Oil Mill Gazetteer of July 1950, suggested that 250 pounds per ton should be used.)

Fuel costs per ton are constant for each type of process; they are shown in table 6.

Electric Power and Water

Electric power requirements were grouped into 4 categories for estimating purposes: (1) Seed processing, (2) seed unloading, (3) seed cooling, and (4) meal processing.

Seed unloading, seed cooling, and meal processing requirements are the same as those used in MRR No. 54. Seed processing requirements for hydraulic and solvent mills are unchanged, but those for screw-press mills are as shown in table 10.

TABLE 10.--PROCESSING POWER DEMANDS OF SCREW-PRESS COTTONSEED OIL MILLS, BY DAILY THROUGHPUT PER SCREW-PRESS[1]

Daily throughput per screw press	Power demand per ton of seed per hour for--				
	Producing[2]			Delinting	Total[3]
	Oil extraction	Other	Total		
Tons	*Kilowatts*	*Kilowatts*	*Kilowatts*	*Kilowatts*	*Kilowatts*
30.00	49	44	93	36	129
30.77	49	44	93	36	129
31.25	49	44	93	36	129
33.33	48	44	92	36	128
35.00	46	44	90	36	126
35.71	45	44	89	36	125
36.36	44	44	88	36	124
37.50	43	44	87	36	123
40.00	41	44	85	36	121
41.67	39	44	83	36	119
42.86	38	44	82	36	118
43.75	37	44	81	36	117
44.44	36	44	80	36	116
50.00	32	44	76	36	112

[1] Does not include seed unloading, seed cooling, and meal processing power demand.
[2] See calculations and discussion in: Brewster, John M., Conversion of Small Hydraulic Cottonseed Oil Mills into Higher Oil-Yielding Mills, Mktg. Res. Rpt. No. 187, U. S. Dept. Agr., Agr. Mktg. Serv. 73 pp. illus. 1957.
[3] These kilowatts per hour equal power consumption per ton of seed.

Power costs were estimated by using an average rate of 1.1 cents per kilowatt-hour. This was the average paid by 78 cottonseed oil mills during 1954, according to a recent survey of the industry. These costs per ton of seed are shown in table 17.

Water requirements per ton of seed for each type of mill are unchanged from those listed in MRR No. 54, and are shown in table 11 along with costs per ton of seed. These costs are shown also in table 6.

TABLE 11.--WATER REQUIREMENTS AND COSTS PER TON OF COTTONSEED PROCESSED, BY TYPE OF MILL, 1955-56

Type of mill	Requirements[1]	Cost[2]
	Gallons	*Dollars*
Hydraulic	22	0.006
Screw-press	56	.014
Direct-solvent	321	.080
Prepress-solvent	221	.055

[1] From MRR No. 54, table 68, page 127.
[2] Based on an average cost of 25 cents per 1,000 gallons of water, which was estimated from water rates of 20 cottonseed oil mill locations in Arkansas, Georgia, Louisiana, South Carolina, Oklahoma, and Texas.

Labor

Mill labor is classified into the following types: (1) Seed unloading, (2) production, (3) meal grinding (or pelleting) and sacking, (4) product loading, and (5) dormant season.

The seed-unloading requirement of 0.128 man-hour per ton remains unchanged as shown in MRR No. 54, pages 115-116.

Product loading labor of 0.5 man-hour per ton of products loaded is also unchanged (see MRR No. 54, p. 122). Some products are not stored, but are loaded directly from the production line into truck or car for delivery, and in such cases no loading labor is required. For estimating purposes, it was assumed that approximately half of the products would require loading. For screw-press and solvent mills, oil loading requirements are included in production labor.

For meal-grinding and sacking, 0.51 man-hour per ton of meal or 0.24 man-hour per ton of seed was used (see MRR No. 54, p. 122).

Production labor is defined as all man-hours, except those used for meal grinding and sacking, which are required in handling seed from the point of storage up to and including the placement of products directly from the production line into truck or car for delivery or into storage for later shipment.

Production labor requirements for all types of mills with daily crushes ranging from 20 through 560 tons are shown in table 12. Production labor requirements for hydraulic mills are unchanged from those in MRR No. 54. Adjustments have been made in requirements of the oil-extraction departments for the solvent and screw-press mills. For solvent mills, a foreman was added at 160 tons per day because, if only 1 man is in the solvent extraction department, a potential hazard exists unless someone looks in on him frequently. The point of addition was arbitrary, and the provision of a foreman might be deemed unnecessary by some managements. For all the estimates, it was assumed that a superintendent would be on the job at all times. For direct-solvent mills, it was assumed that the preparatory work would be done by men who do the hulling and separating. Production labor requirements are shown in figure 1 for each of the most profitable mills analyzed.

Dormant-season labor requirements (labor kept on hand during the mill's down-season) are unchanged from those shown in MRR No. 54 on page 124.

TABLE 12.--PRODUCTION LABOR REQUIREMENTS FOR HYDRAULIC, MODERN SCREW-PRESS, DIRECT-SOLVENT, AND PREPRESS-SOLVENT COTTONSEED OIL MILLS, BY DAILY CAPACITIES

Daily capacity (tons)	Hydraulic[1]						Modern screw-press		Direct-solvent		Prepress-solvent	
	1 cooker and 1 to 13 presses		2 cookers and 14 to 25 presses		4 cookers and 26 to 40 presses		Per day	Per ton of seed	Per day	Per ton of seed	Per day	Per ton of seed
	Per day	Per ton of seed	Per day	Per ton of seed	Per day	Per ton of seed						
	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours	Man-hours
20	216	10.80	---	---	---	---	172	8.60	172	8.60	200	10.00
40	240	6.00	---	---	---	---	196	4.90	196	4.90	224	5.60
60	288	4.80	---	---	---	---	220	3.67	220	3.67	248	4.13
80	336	4.20	---	---	---	---	244	3.05	244	3.05	272	3.40
100	384	3.84	---	---	---	---	268	2.68	272	2.72	304	3.04
120	408	3.40	432	3.60	---	---	296	2.47	296	2.47	328	2.73
140	456	3.26	480	3.43	---	---	320	2.29	320	2.29	352	2.51
160	480	3.00	504	3.15	---	---	348	2.18	372	2.33	400	2.50
180	---	---	552	3.07	---	---	372	2.07	396	2.20	424	2.36
200	---	---	624	3.12	---	---	400	2.00	424	2.12	448	2.24
220	---	---	648	2.95	696	3.16	424	1.93	448	2.04	472	2.15
240	---	---	672	2.80	720	3.00	452	1.88	472	1.97	500	2.08
260	---	---	696	2.68	744	2.86	476	1.83	504	1.94	524	2.02
280	---	---	768	2.74	816	2.91	504	1.80	528	1.89	548	1.96
300	---	---	792	2.64	840	2.80	528	1.76	560	1.87	572	1.91
320	---	---	816	2.55	864	2.70	560	1.75	584	1.83	604	1.89
340	---	---	840	2.47	888	2.61	584	1.72	608	1.79	628	1.85
360	---	---	---	---	960	2.67	612	1.70	632	1.76	652	1.81
380	---	---	---	---	984	2.59	636	1.67	656	1.73	676	1.78
400	---	---	---	---	1,008	2.52	664	1.66	688	1.72	712	1.78
420	---	---	---	---	1,128	2.69	688	1.64	712	1.70	736	1.75
440	---	---	---	---	1,152	2.62	712	1.62	736	1.67	760	1.73
460	---	---	---	---	1,176	2.56	736	1.60	760	1.65	784	1.70
480	---	---	---	---	1,200	2.50	768	1.60	784	1.63	816	1.70
500	---	---	---	---	1,224	2.45	792	1.58	808	1.62	840	1.68
520	---	---	---	---	1,248	2.40	816	1.57	832	1.60	864	1.66
540	---	---	---	---	1,272	2.36	840	1.56	856	1.59	888	1.64
560	---	---	---	---	1,296	2.31	864	1.54	880	1.57	912	1.63

[1] Hydraulic mills are classifed here by number of cookers to show the sharp break in downward trend of labor requirements per ton of seed crushed that occurs with increase in number of cookers. With the other types of mills additional machines are associated with such small increments of labor that discontinuities in man-hours per ton of seed crushed are insignificant.

The average wage rate reported by 118 mills for the 1954-55 season was 92 cents per hour. This amount was increased by one-third for the 1955-56 season, since minimum wages were increased from $0.75 to $1.00 per hour early in 1956. Wage differentials associated with different types of mills are the same as those used in MRR No. 54, screw-press mills paying 5 cents more than hydraulic mills, and solvent mills paying 5 cents more than screw-press mills. On this basis, the average hourly wage rates used for all labor except seed unloading are:

Hydraulic mills	$1.22
Screw-press mills	1.27
Solvent mills	1.32

The wage rate used for seed-unloading labor was $1.00 per hour, since, in general, this labor receives the minimum wage.

Labor costs per ton of seed are summarized in table 13. Totals are shown both including and excluding dormant-season labor.

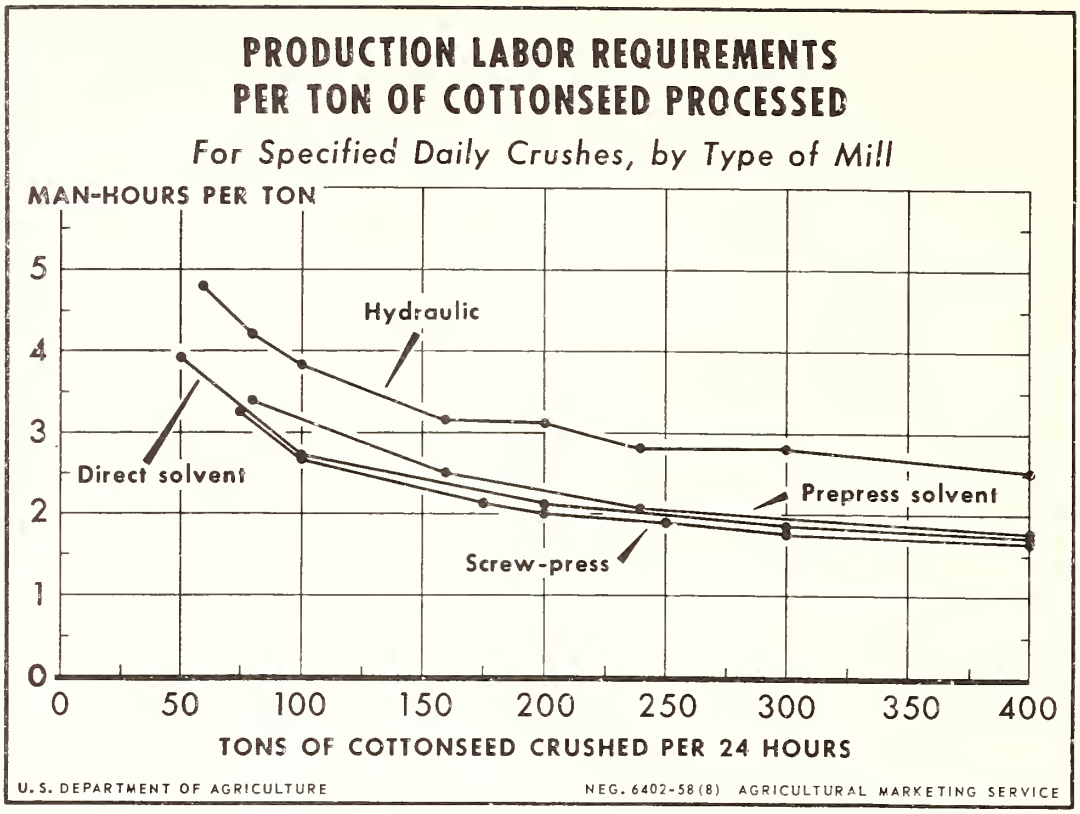

Figure 1

TABLE 13.--TOTAL LABOR COST PER TON OF COTTONSEED PROCESSED FOR DIFFERENT TYPES AND SIZES OF MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

Type of mill	Seed crushed per 24 hours	Length of season	Labor cost				
			Production	Seed unloading, meal grinding, product loading	Dormant season	Total	
						Excluding dormant-season labor	Including dormant-season labor
	ANNUAL CRUSH: 10,600 TONS						
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	60	8.0	5.856	0.721	0.976	6.577	7.553
Screw-press: 2-press	75	6.4	4.128	.691	1.204	4.819	6.023
Direct-solvent: Plant 1	50	9.6	5.174	.710	.970	5.884	6.854
Prepress-solvent: Plant 2	80	6.0	4.488	.709	1.496	5.197	6.693
	ANNUAL CRUSH: 13,200 TONS						
Hydraulic: 8-press	80	7.5	5.124	0.721	1.025	5.845	6.870
Screw-press: 2-press	75	8.0	4.128	.691	.688	4.819	5.507
Direct-solvent: Plant 1	50	12.0	5.174	.710	---	5.884	5.884
Prepress-solvent: Plant 2	80	7.5	4.488	.709	.898	5.197	6.095
	ANNUAL CRUSH: 21,100 TONS						
Hydraulic: 8-press	80	12.0	5.124	0.721	---	5.845	5.845
Screw-press: 3-press	100	9.6	3.404	.691	0.638	4.095	4.733
Direct-solvent: Plant 2	100	9.6	3.590	.710	.673	4.300	4.973
Prepress-solvent: Plant 2	80	12.0	4.488	.709	---	5.197	5.197
	ANNUAL CRUSH: 26,400 TONS						
Hydraulic: 10-press	100	12.0	4.685	0.721	---	5.406	5.406
Screw-press: 3-press	100	12.0	3.404	.691	---	4.095	4.095
Direct-solvent: Plant 2	100	12.0	3.590	.710	---	4.300	4.300
Prepress-solvent: Plant 3	160	7.5	3.300	.709	0.660	4.009	4.669

Continued

TABLE 13.--TOTAL LABOR COST PER TON OF COTTONSEED PROCESSED FOR DIFFERENT TYPES AND SIZES OF MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56--Continued

Type of mill	Seed crushed per 24 hours	Length of season	Labor cost				
			Production	Seed unloading, meal grinding, product loading	Dormant season	Total	
						Excluding dormant-season labor	Including dormant-season labor
	ANNUAL CRUSH: 42,200 TONS						
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 16-press	160	12.0	3.843	0.721	---	4.564	4.564
Screw-press: 5-press	175	11.0	2.705	.691	0.228	3.396	3.624
Direct-solvent: Plant 3	200	9.6	2.798	.710	.525	3.508	4.033
Prepress-solvent: Plant 3	160	12.0	3.300	.709	---	4.009	4.009
	ANNUAL CRUSH: 52,800 TONS						
Hydraulic: 20-press	200	12.0	3.806	0.721	---	4.527	4.527
Screw-press: 6-press	200	12.0	2.540	.691	---	3.231	3.231
Direct-solvent: Plant 3	200	12.0	2.798	.710	---	3.508	3.508
Prepress-solvent: Plant 4	240	10.0	2.746	.709	0.412	3.455	3.867
	ANNUAL CRUSH: 63,400 TONS						
Hydraulic: 24-press	240	12.0	3.416	0.721	---	4.137	4.137
Screw-press: 8-press	250	11.5	2.413	.691	0.101	3.104	3.205
Direct-solvent: Plant 4	300	9.6	2.468	.710	.462	3.178	3.640
Prepress-solvent: Plant 4	240	12.0	2.746	.709	---	3.455	3.455
	ANNUAL CRUSH: 79,200						
Hydraulic: 30-press	300	12.0	3.416	0.721	---	4.137	4.137
Screw-press: 10-press	300	12.0	2.235	.691	---	2.926	2.926
Direct-solvent: Plant 4	300	12.0	2.468	.710	---	3.178	3.178
Prepress-solvent: Plant 5	400	9.0	2.350	.709	0.522	3.059	3.581
	ANNUAL CRUSH: 105,600 TONS						
Hydraulic: 40-press	400	12.0	3.074	0.721	---	3.795	3.795
Screw-press: 13-press	400	12.0	2.108	.691	---	2.799	2.799
Direct-solvent: Plant 5	400	12.0	2.270	.710	---	2.980	2.980
Prepress-solvent: Plant 5	400	12.0	2.350	.709	---	3.059	3.059

Laboratory Services, Brokerage Fees, Insurance on Stocks, and Welfare Risks

Costs per ton of seed for laboratory services, brokerage fees, insurance on stocks, and welfare risks are shown in table 14.

Laboratory services: The amount of laboratory services used by mills varies among different managements. To place all mills on a comparable basis, it was assumed they would use the usually recommended amounts as shown in table 15, which is the same as table 72 in MRR No. 54 except for an adjustment of prices to current levels and the addition of 2 cake samples per week per screw press to check on the efficiency of the performance of each press.

Brokerage fees: Brokerage fees, shown in table 15, were allowed for all product sales since it was assumed that all products would be sold wholesale. In MRR No. 54, these fees were not allowed for local product sales.

Insurance on stocks: Insurance charges were allowed for the average number of tons of seed stored per month and for the maximum amount of each product stored. There has been no change in these charges since 1949-50 (see MRR No. 54, table 73, p. 130).

TYPE 14.--TOTAL MISCELLANEOUS VARIABLE COSTS PER TON OF COTTONSEED PROCESSED FOR DIFFERENT TYPES AND SIZES OF MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

Type of mill	Seed crushed per 24 hours	Length of operating season	Cost				
			Laboratory services	Insurance on stocks	Brokerage fees	Welfare risks[1]	Total
	ANNUAL CRUSH: 10,600 TONS						
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	60	8.0	0.405	0.222	0.422	0.591	1.640
Screw-press: 2-press	75	6.4	.393	.177	.430	.459	1.459
Direct-solvent: Plant 1	50	9.6	.439	.248	.437	.539	1.663
Prepress-solvent: Plant 2	80	6.0	.370	.170	.439	.487	1.466
	ANNUAL CRUSH: 13,200 TONS						
Hydraulic: 8-press	80	7.5	.367	.207	.422	.533	1.529
Screw-press: 2-press	75	8.0	.393	.223	.430	.456	1.502
Direct-solvent: Plant 1	50	12.0	.439	.278	.437	.536	1.690
Prepress-solvent: Plant 2	80	7.5	.370	.209	.439	.484	1.502
	ANNUAL CRUSH: 21,100 TONS						
Hydraulic: 8-press	80	12.0	.367	.278	.422	.525	1.592
Screw-press: 3-press	100	9.6	.365	.249	.431	.394	1.439
Direct-solvent: Plant 2	100	9.6	.347	.249	.437	.409	1.442
Prepress-solvent: Plant 2	80	12.0	.370	.279	.439	.476	1.564
	ANNUAL CRUSH: 26,400 TONS						
Hydraulic: 10-press	100	12.0	.344	.279	.422	.488	1.533
Screw-press: 3-press	100	12.0	.365	.279	.431	.390	1.465
Direct-solvent: Plant 2	100	12.0	.347	.280	.437	.405	1.469
Prepress-solvent: Plant 3	160	7.5	.313	.210	.439	.383	1.345
	ANNUAL CRUSH: 42,200 TONS						
Hydraulic: 16-press	160	12.0	.310	.280	.422	.412	1.424
Screw-press: 5-press	175	11.0	.324	.273	.430	.324	1.351
Direct-solvent: Plant 3	200	9.6	.301	.251	.437	.333	1.322
Prepress-solvent: Plant 3	160	12.0	.313	.281	.439	.370	1.403
	ANNUAL CRUSH: 52,800 TONS						
Hydraulic: 20-press	200	12.0	.298	.281	.422	.402	1.403
Screw-press: 6-press	200	12.0	.319	.282	.431	.305	1.337
Direct-solvent: Plant 3	200	12.0	.301	.282	.437	.326	1.346
Prepress-solvent: Plant 4	240	10.0	.293	.260	.439	.322	1.314
	ANNUAL CRUSH: 63,400 TONS						
Hydraulic: 24-press	240	12.0	.290	.282	.422	.368	1.362
Screw-press: 8-press	250	11.5	.311	.276	.431	.290	1.308
Direct-solvent: Plant 4	300	9.6	.286	.252	.437	.296	1.271
Prepress-solvent: Plant 4	240	12.0	.293	.283	.439	.317	1.332
	ANNUAL CRUSH: 79,200 TONS						
Hydraulic: 30-press	300	12.0	.283	.283	.422	.362	1.350
Screw-press: 10-press	300	12.0	.306	.284	.431	.271	1.292
Direct-solvent: Plant 4	300	12.0	.286	.284	.437	.290	1.297
Prepress-solvent: Plant 5	400	9.0	.278	.243	.439	.281	1.241
	ANNUAL CRUSH: 105,600 TONS						
Hydraulic: 40-press	400	12.0	.275	.285	.422	.333	1.315
Screw-press: 13-press	400	12.0	.297	.286	.431	.258	1.272
Direct-solvent: Plant 5	400	12.0	.278	.286	.437	.272	1.273
Prepress-solvent: Plant 5	400	12.0	.278	.286	.439	.278	1.281

[1] Workmen's compensation, general liability, and social security.

TABLE 15.--COTTONSEED OIL MILL LABORATORY SERVICES AND CHARGES, 1955-56

Service	Charge	
	Per sample	Per day
	Dollars	*Dollars*
One seed sample per 25-ton lot of seed purchased	5.00	---
Analytical control work:		
3 samples per day of cake produced (1 per shift).		
1 hull sample per 24-hour day.		
1 sample per day of seed processed.		
Total of 5 samples per day	---	8.50
One oil sample per tank car of oil[1]	5.00	---
One cake or meal sample per cake shipment[1]	1.60	---
2 samples of cake per screw press per week	---	.62
One linter sample per week	3.50	---

[1] 60,000 pounds per car used in determining total number of samples.

Source: Information from commercial cottonseed oil mill laboratories.

TABLE 16.--BROKERAGE FEES ON COTTONSEED PRODUCTS SOLD WHOLESALE, 1955-56

Product	Unit	Fee
		Dollars
Oil	Tank car[1]	30.00
Meal (any form)	Ton	.25
Linters	100 pounds	.05
Hulls	Ton	.25

[1] Capacity approximately 60,000 pounds of oil.

Source: Reports of cottonseed oil mill product brokers.

Welfare risks: In MRR No. 54, different rates were used in the 6 mill areas for workmen's compensation and general liability. In this report, these rates were averaged for the States having cottonseed oil mills. The rates used were $4.53 per $100 of payroll for workmen's compensation and general liability, and 3 percent of the total payroll for social security and unemployment insurance.

COMPARATIVE ECONOMIES OF DIFFERENT TYPES AND SIZES OF MILLS

Economies of different mills are discussed in terms of (1) the most economical type of mill for specified volumes of seed, (2) effect of change in type of mill on costs and revenues, (3) effect of change in size of annual crush on cost, and (4) differences in processing costs and revenues in 1949-50 and 1955-56.

Most Economical Type Mill for Specified Volumes of Seed

Net revenues per ton of seed, shown in table 17, provide the basis for determining the most economical type and size of mill for the specified volumes of seed. These revenues are based on the assumption that the same meal price is received by all mills, regardless of the type of oil-extraction process. The effect of price differentials applying to meal produced by different types of mills and the adjustments necessary in net revenues are considered later in this report.

The main conclusions are as follows:

First, no one type of mill was most profitable for all the different volumes of seed. At the smallest crush of 10,600 tons, the screw-press mill was most profitable, with a net revenue of $1.88 per ton of seed processed, compared to $1.57 for the direct-solvent mill and $1.01 for the prepress-solvent. Either the direct-solvent or prepress-solvent mill was most profitable for all larger crushes. Which solvent mill was more profitable was determined by which one operated the longer season and thus used a higher percentage of its annual capacity. For example, at 13,200 tons, the direct-solvent operated for 12 months and the prepress-solvent for 7.5 months; therefore, the direct-solvent made the biggest net revenue per ton. The only crush at which both types operated for the same length of season was at the largest crush of 105,600 tons. Here the prepress-solvent type was more profitable, but the difference in net revenue of 4 cents per ton of seed is too small actually to favor one type over the other.

Second, the hydraulic mill was the least profitable type at all crushes, and at 10,600 tons, it actually lost money.

In some meal markets, mechanically processed meal sells at premiums over solvent-processed meal. The premiums range from $1 to $5 per ton, the usual premium being $3. (See footnote 2, p. 3) If meal produced by the solvent-extraction processes were discounted at $3 per ton, based on a meal yield of 947 pounds, meal revenue would be reduced by $1.42 per ton of seed for solvent-extraction mills. Under this condition, the screw-press mill would be the most profitable type at all sizes of crush considered in this study.

Net revenues per ton of seed for all types of mills rose rapidly as size of crush increased up to about 40,000 tons, and then began to level off (fig. 2). As total revenue for hydraulic and solvent mills was not assumed to vary with size of crush, these gains in net revenues for larger crushes reflect like decreases in processing costs.

Effect of Change in Type of Mill on Costs and Revenues

The main costs affected by a change in type of mill are those for plant, labor, and electric power, and the costs that are constant for each type of mill (table 6). Miscellaneous variable costs (table 14) also are affected by change in type of mill. Changes in these costs that would result in shifting from lower to higher oil-yielding types of mills at specified annual crushes are shown in table 18 along with changes in revenues.

Labor costs are always lowest for screw-press mills and highest for hydraulics, even though the average hourly wage rate is lowest for hydraulic mills. Screw-press mills always have the highest electric power costs, and direct-solvents the lowest. In general, prepress-solvent mills have the highest plant costs because their total investments are biggest. Costs that are constant for each type of mill (table 6) are highest for the direct-solvent and prepress-solvent mills, mainly because of their higher fuel costs and the costs of hexane solvent and acidulated soapstock that are not used by the other types.

In shifting from a lower to a higher oil-yielding type of mill, the increase in total revenue must be large enough to offset increased costs if a net gain is to be realized.

TABLE 17.--CALCULATED COSTS AND REVENUE PER TON OF SEED FOR DIFFERENT COTTONSEED OIL MILLS FOR EACH OF SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

Type of mill	Seed crushed per 24 hours	Length of operating season	Throughput per screw press per day	Costs									Revenue	
				Constant			Variable					Total	Gross[6]	Net
				Each annual crush[1]	Each type of process[2]	Total	Plant[3]	Labor[4]	Electric power	Miscellaneous[5]	Total			
	ANNUAL CRUSH: 10,600 TONS													
	Tons	*Months*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	60	8.0	---	61.993	1.984	63.977	8.807	7.553	1.079	1.640	19.079	83.056	81.324	-1.732
Screw-press: 2-press	75	6.4	37.50	61.993	2.172	64.165	8.957	6.023	1.579	1.459	18.018	82.183	84.063	1.880
Direct-solvent: Plant 1	50	9.6	---	61.993	3.563	65.556	9.598	6.854	1.092	1.663	19.207	84.763	86.334	1.571
Prepress-solvent: Plant 2	80	6.0	---	61.993	3.448	65.441	11.107	6.693	1.226	1.466	20.492	85.933	86.939	1.006
	ANNUAL CRUSH: 13,200 TONS													
Hydraulic: 8-press	80	7.5	---	61.940	1.984	63.924	7.473	6.870	1.058	1.529	16.930	80.854	81.324	.470
Screw-press: 2-press	75	8.0	37.50	61.940	2.172	64.112	7.411	5.507	1.640	1.502	16.060	80.172	84.063	3.891
Direct-solvent: Plant 1	50	12.0	---	61.940	3.563	65.503	7.955	5.884	1.182	1.690	16.711	82.214	86.334	4.120
Prepress-solvent: Plant 2	80	7.5	---	61.940	3.448	65.388	9.050	6.095	1.278	1.502	17.925	83.313	86.939	3.626
	ANNUAL CRUSH: 21,100 TONS													
Hydraulic: 8-press	80	12.0	---	61.829	1.984	63.813	5.236	5.845	1.226	1.592	13.899	77.712	81.324	3.612
Screw-press: 3-press	100	9.6	33.33	61.829	2.172	64.001	5.620	4.733	1.751	1.439	13.543	77.544	84.302	6.758
Direct-solvent: Plant 2	100	9.6	---	61.829	3.563	65.392	6.270	4.973	1.092	1.442	13.777	79.169	86.334	7.165
Prepress-solvent: Plant 2	80	12.0	---	61.829	3.448	65.277	6.221	5.197	1.446	1.564	14.428	79.705	86.939	7.234
	ANNUAL CRUSH: 26,400 TONS													
Hydraulic: 10-press	100	12.0	---	61.732	1.984	63.716	4.690	5.406	1.226	1.533	12.855	76.571	81.324	4.753
Screw-press: 3-press	100	12.0	33.33	61.732	2.172	63.904	4.704	4.095	1.842	1.465	12.106	76.010	84.302	8.292
Direct-solvent: Plant 2	100	12.0	---	61.732	3.563	65.295	5.224	4.300	1.182	1.469	12.175	77.470	86.334	8.864
Prepress-solvent: Plant 3	160	7.5	---	61.732	3.448	65.180	6.471	4.669	1.278	1.345	13.763	78.943	86.939	7.996
	ANNUAL CRUSH: 42,200 TONS													
Hydraulic: 16-press	160	12.0	---	61.524	1.984	63.508	4.101	4.564	1.226	1.424	11.315	74.823	81.324	6.501
Screw-press: 5-press	175	11.0	35.00	61.524	2.172	63.696	4.238	3.624	1.785	1.351	10.998	74.694	84.188	9.494
Direct-solvent: Plant 3	200	9.6	---	61.524	3.563	65.087	4.595	4.033	1.092	1.322	11.042	76.129	86.334	10.205
Prepress-solvent: Plant 3	160	12.0	---	61.524	3.448	64.972	4.549	4.009	1.446	1.403	11.407	76.379	86.939	10.560
	ANNUAL CRUSH: 52,800 TONS													
Hydraulic: 20-press	200	12.0	---	61.492	1.984	63.476	3.819	4.527	1.226	1.403	10.975	74.451	81.324	6.873
Screw-press: 6-press	200	12.0	33.33	61.492	2.172	63.664	3.824	3.231	1.842	1.337	10.234	73.898	84.302	10.404
Direct-solvent: Plant 3	200	12.0	---	61.492	3.563	65.055	3.951	3.508	1.182	1.346	9.987	75.042	86.334	11.292
Prepress-solvent: Plant 4	240	10.0	---	61.492	3.448	64.940	4.554	3.867	1.373	1.314	11.108	76.048	86.939	10.891
	ANNUAL CRUSH: 63,400 TONS													
Hydraulic: 24-press	240	12.0	---	61.434	1.984	63.418	3.576	4.137	1.226	1.362	10.301	73.719	81.324	7.605
Screw-press: 8-press	250	11.5	31.25	61.434	2.172	63.606	3.725	3.205	1.834	1.308	10.072	73.678	84.428	10.750
Direct-solvent: Plant 4	300	9.6	---	61.434	3.563	64.997	4.148	3.640	1.092	1.271	10.151	75.148	86.334	11.186
Prepress-solvent: Plant 4	240	12.0	---	61.434	3.448	64.882	4.000	3.455	1.446	1.332	10.233	75.115	86.939	11.824
	ANNUAL CRUSH: 79,200 TONS													
Hydraulic: 30-press	300	12.0	---	61.450	1.984	63.434	3.699	4.137	1.226	1.350	10.412	73.846	81.324	7.478
Screw-press: 10-press	300	12.0	33.33	61.450	2.172	63.622	3.641	2.926	1.853	1.292	9.712	73.334	84.428	11.094
Direct-solvent: Plant 4	300	12.0	---	61.450	3.563	65.013	3.579	3.178	1.182	1.297	9.236	74.249	86.334	12.085
Prepress-solvent: Plant 5	400	9.0	---	61.450	3.448	64.898	4.297	3.581	1.333	1.241	10.452	75.350	86.939	11.589
	ANNUAL CRUSH: 105,600 TONS													
Hydraulic: 40-press	400	12.0	---	61.754	1.984	63.738	3.400	3.795	1.226	1.315	9.736	73.474	81.324	7.850
Screw-press: 13-press	400	12.0	30.77	61.754	2.172	63.926	3.379	2.799	1.853	1.272	9.303	73.229	84.428	11.199
Direct-solvent: Plant 5	400	12.0	---	61.754	3.563	65.317	3.239	2.980	1.182	1.273	8.674	73.991	86.334	12.343
Prepress-solvent: Plant 5	400	12.0	---	61.754	3.448	65.202	3.569	3.059	1.446	1.281	9.355	74.557	86.939	12.382

[1] From table 5. [2] From table 6. [3] From table 4. [4] From table 13. [5] From table 14. [6] From table 3.

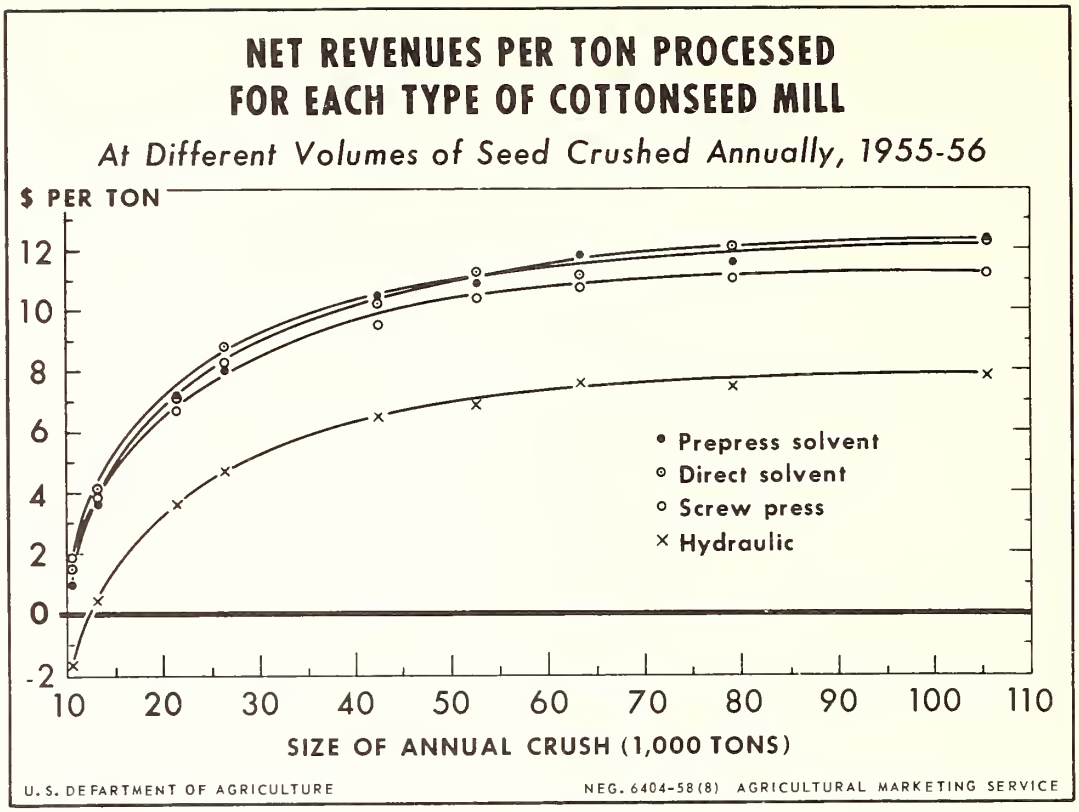

Figure 2

These increases in total revenue are approximately equal to increases in oil revenue. Meal and linters revenues were assumed to be the same for all types of mills, while differences in hull revenues are minor (table 3).

From table 18, the following conclusions can be drawn:

(1) Shifting from a hydraulic to a screw-press mill results in lower costs at all crushes, ranging from $0.04 to $0.87 per ton. Thus the gains in net revenue are equivalent to these savings in costs plus the increase in total revenues. The biggest savings in costs are at 10,600 and 13,200 tons, mainly because of the large decreases in labor costs. Since the amount of the increase in revenue varies with throughput per screw-press, the crush with the biggest net gain is not necessarily the one having the biggest decrease in costs. For example, at 13,200 tons, the decrease in costs is $0.68 per ton, whereas at 79,200 tons the decrease is only $0.51 per ton. However, the increase in revenue is $0.37 per ton larger at 79,200 tons than at 13,200 tons. Thus the increase in net revenue at 79,200 tons is $0.20 higher per ton than at the 13,200-ton crush.

(2) Shifting from the hydraulic to either type of solvent mill results in higher costs. These increased costs range from $0.40 to $1.71 per ton for shifts to direct-solvent mills and range from $1.08 to $2.88 for shifts to prepress-solvents. However, the increases in total revenues ($5.01 per ton for shifts to direct-solvent and $5.62 per ton for shifts to prepress-solvent) are large enough to result in net gains at all crushes.

(3) Shifting from the screw-press to either direct-solvent or prepress-solvent mills results in higher costs, and for some crushes the increased revenue is not large enough to offset these increased costs. This is true at the 10,600-ton crush for both types of solvent mills, and at 13,200 and 26,400 tons for the prepress-solvent mills. When shifting to direct-solvent, the increases in costs range from $0.76 to $2.58 per ton, whereas the increase in total revenue ranges from $1.91 to $2.27 per ton. This compares with

increases in costs of $1.33 to $3.75, and increases in total revenue of $2.51 to $2.88 when shifting to prepress-solvent.

TABLE 18.--INCREASED COSTS AND REVENUES RESULTING FROM SHIFTS FROM LOWER TO HIGHER OIL-YIELDING TYPES OF COTTONSEED OIL MILLS, 1955-56

Size of annual crush (tons)	Increased costs						Increased revenue	
	Plant	Labor	Electric power	Miscellaneous variable[1]	Constant[2]	Total	Total	Net
	HYDRAULIC TO SCREW PRESS							
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
10,600	0.150	-1.530	0.500	-0.181	0.188	-0.873	2.739	3.612
13,200	-.062	-1.363	.582	-.027	.188	-.682	2.739	3.421
21,100	.384	-1.112	.525	-.153	.188	-.168	2.978	3.146
26,400	.014	-1.311	.616	-.068	.188	-.561	2.978	3.539
42,200	.137	-.940	.559	-.073	.188	-.129	2.864	2.993
52,800	.005	-1.296	.616	-.066	.188	-.553	2.978	3.531
63,400	.149	-.932	.608	-.054	.188	-.041	3.104	3.145
79,200	-.058	-1.211	.627	-.058	.188	-.512	3.104	3.616
105,600	-.021	-.996	.627	-.043	.188	-.245	3.104	3.349
	HYDRAULIC TO DIRECT SOLVENT							
10,600	.791	-.699	.013	.023	1.579	1.707	5.010	3.303
13,200	.482	-.986	.124	.161	1.579	1.360	5.010	3.650
21,100	1.034	-.872	-.134	-.150	1.579	1.457	5.010	3.553
26,400	.534	-1.106	-.044	-.064	1.579	.899	5.010	4.111
42,200	.494	-.531	-.134	-.102	1.579	1.306	5.010	3.704
52,800	.132	-1.019	-.044	-.057	1.579	.591	5.010	4.419
63,400	.572	-.497	-.134	-.091	1.579	1.429	5.010	3.581
79,200	-.120	-.959	-.044	-.053	1.579	.403	5.010	4.607
105,600	-.161	-.815	-.044	-.042	1.579	.517	5.010	4.493
	HYDRAULIC TO PREPRESS SOLVENT							
10,600	2.300	-0.860	.147	-.174	1.464	2.877	5.615	2.738
13,200	1.577	-.775	.220	-.027	1.464	2.459	5.615	3.156
21,100	.985	-.648	.220	-.028	1.464	1.993	5.615	3.622
26,400	1.781	-.737	.052	-.188	1.464	2.372	5.615	3.243
42,200	.448	-.555	.220	-.021	1.464	1.556	5.615	4.059
52,800	.735	-.660	.147	-.089	1.464	1.597	5.615	4.018
63,400	.424	-.682	.220	-.030	1.464	1.396	5.615	4.219
79,200	.598	-.556	.107	-.109	1.464	1.504	5.615	4.111
105,600	.169	-.736	.220	-.034	1.464	1.083	5.615	4.532
	SCREW PRESS TO DIRECT SOLVENT							
10,600	.641	.831	-.487	.204	1.391	2.580	2.271	-.309
13,200	.544	.377	-.458	.188	1.391	2.042	2.271	.229
21,100	.650	.240	-.659	.003	1.391	1.625	2.032	.407
26,400	.520	.205	-.660	.004	1.391	1.460	2.032	.572
42,200	.357	.409	-.693	-.029	1.391	1.435	2.146	.711
52,800	.127	.277	-.660	.009	1.391	1.144	2.032	.888
63,400	.423	.435	-.742	-.037	1.391	1.470	1.906	.436
79,200	-.062	.252	-.671	.005	1.391	.915	1.906	.991
105,600	-.140	.181	-.671	.001	1.391	.762	1.906	1.144
	SCREW PRESS TO PREPRESS SOLVENT							
10,600	2.150	.670	-.353	.007	1.276	3.750	2.876	-.874
13,200	1.639	.588	-.362	0	1.276	3.141	2.876	-.265
21,100	.601	.464	-.305	.125	1.276	2.161	2.637	.476
26,400	1.767	.574	-.564	-.120	1.276	2.933	2.637	-.296
42,200	.311	.385	-.339	.052	1.276	1.685	2.751	1.066
52,800	.730	.636	-.469	-.023	1.276	2.150	2.637	.487
63,400	.275	.250	-.388	.024	1.276	1.437	2.511	1.074
79,200	.656	.655	-.520	-.051	1.276	2.016	2.511	.495
105,600	.190	.260	-.407	.009	1.276	1.328	2.511	1.183
	DIRECT SOLVENT TO PREPRESS SOLVENT							
10,600	1.509	-.161	.134	-.197	-.115	1.170	.605	-.565
13,200	1.095	.211	.096	-.188	-.115	1.099	.605	-.494
21,100	-.049	.224	.354	.122	-.115	.536	.605	.069
26,400	1.247	.369	.096	-.124	-.115	1.473	.605	-.868
42,200	-.046	-.024	.354	.081	-.115	.250	.605	.355
52,800	.603	.359	.191	-.032	-.115	1.006	.605	-.401
63,400	-.148	-.185	.354	.061	-.115	-.033	.605	.638
79,200	.718	.403	.151	-.056	-.115	1.101	.605	-.496
105,600	.330	.079	.264	.008	-.115	.566	.605	.039

[1] From table 14.
[2] From table 6.

(4) Shifting from the direct-solvent to the prepress-solvent mill results in increased costs at all crushes except 63,400 tons, at which there is a small decrease, 3 cents per ton. The increased costs range from $0.25 to $1.47 per ton, whereas the increase in total revenues is $0.61 per ton. Therefore, this shift is profitable for less than half of the specified crushes.

These differences in net revenues would hold true under the operating conditions, cost rates, and product prices assumed. However, for any particular mill locality, variations in these factors could either increase or decrease differences in net revenues. For example, as previously mentioned, if solvent meal is discounted at $3 per ton, solvent mills would be less profitable and therefore shifts to solvent mills would result in less gain in net revenues per ton for hydraulic mills, and a loss for screw-press mills. On the other hand, if the price of oil were 3 cents higher or lower per pound, the differences in net revenues would be changed as shown in table 19. At the higher price, the higher oil-yielding mills would increase their advantage, whereas at the lower price their advantages would be decreased. Similar differences would result if lower or higher cost rates were applicable. Therefore, the absolute differences in net revenues are to be interpreted within these limitations.

Comparisons of hydraulic mills with the other types are made at all the specified crushes. However, shifts to higher oil-yielding mills would be limited mainly to sizes under 250 tons per day, or under 53,000 tons per year. This is true because few mills processing over 200 tons per day still use the hydraulic process. Most hydraulic mills are the smaller mills, and they process under 100 tons daily.

TABLE 19.--DIFFERENCES IN OIL REVENUES PER TON OF COTTONSEED PROCESSED BY DIFFERENT TYPES OF MILLS AT VARYING OIL PRICES

Type of mill	Gain per ton of seed (hydraulic mill = base) in--			
	Oil yield	Oil revenue for oil price of--		
		10.14 cents per pound	13.14 cents per pound	16.14 cents per pound
	Pounds	*Dollars*	*Dollars*	*Dollars*
Hydraulic	0	0	0	0
Screw-press	17.0-24.6	1.72 - 2.49	2.23 - 3.23	2.74 - 3.97
Direct-solvent	39.7	4.03	5.22	6.41
Prepress-solvent	44.5	4.51	5.85	7.18

Effect of Change in Size of Annual Crush on Costs

The effect of change in size of crush on costs was calculated on the basis of the cost of processing the seed; that is, total cost minus the cost of seed. This method was necessary because the way in which the cost of seed, f.o.b. gins, varies with the quantity purchased could not be calculated (see MRR No. 54, pp. 3-4).

As shown in table 20 and figure 3, processing costs decreased with size of crush with minor exceptions for all types of mills, with the prepress-solvent type showing the greatest decrease, $11.38 per ton of seed, from 10,600 to 105,600 tons. This compares with decreases of $10.77 for direct-solvent, $9.58 for hydraulic, and $8.95 for screw-press mills. Screw-press mills had the lowest costs and prepress-solvent mills the

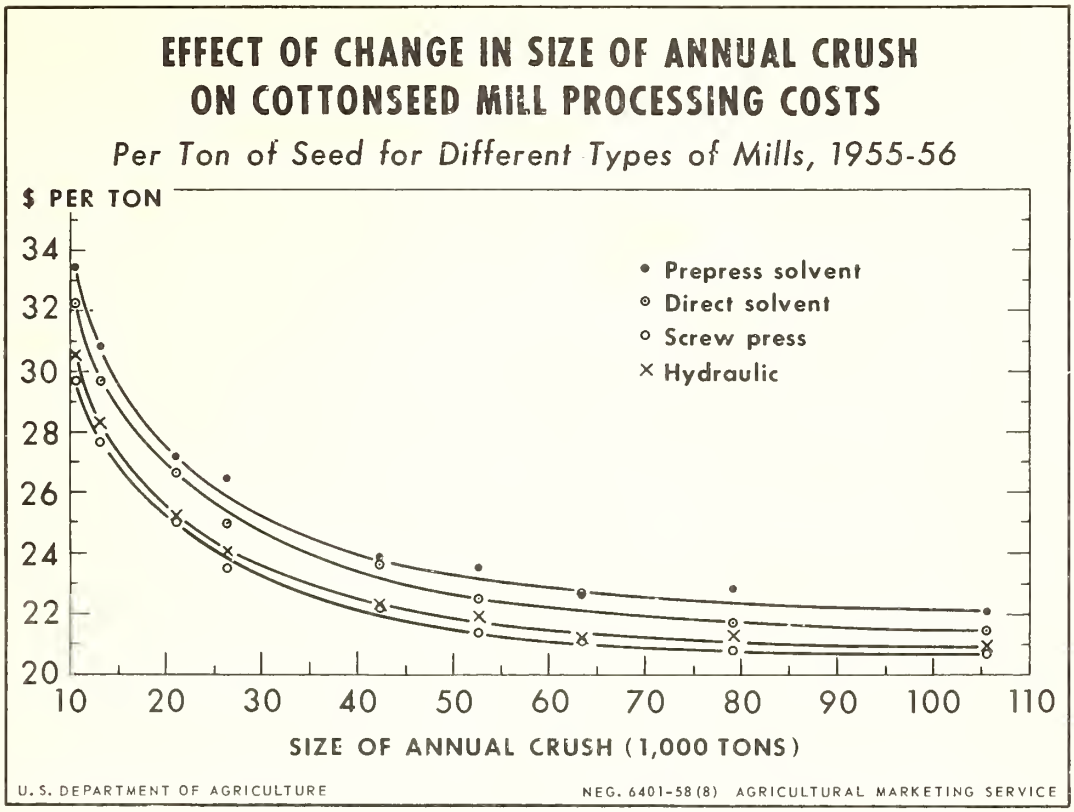

Figure 3

highest, throughout the range of crushes. The difference between the highest and lowest cost mill gradually becomes smaller as the size of crush increases. At 10,600 tons, the difference between the screw-press and prepress-solvent mills is $3.75 per ton of seed, whereas at 105,600 tons, this difference is only $1.33 per ton, or almost two-thirds less than at the smallest crush.

Savings in processing costs accompanying increased sizes of crush for each type of mill are shown in figure 4. The rate of savings, for all types, increased at an increasing rate up through 21,000 tons, after which the increase, generally, was at a decreasing rate. Over half of the total possible savings was accomplished at approximately 21,000 tons, and about 90 percent at 53,000 tons.

Differences in Processing Costs and Revenues in 1949-50 and 1955-56

Some of the findings based on 1955-56 data differ from those based on 1949-50 data. In MRR No. 54, the prepress-solvent mill was shown to be the most profitable type for all crushes in 1949-50. As previously mentioned, this was not true for 1955-56. Because of improvements in the screw-press and direct-solvent processes since 1949-50, the gains in oil yields of the prepress-solvent type over these 2 types have decreased. The oil gains shown by type of process in the 2 periods are as follows, with hydraulic mills as the basis of comparison:

	Oil gains (pounds) per ton of seed	
	1949-50	1955-56
Hydraulic	0	0
Screw-press	8.2	17.0-24.6
Direct-solvent	35.2	39.7
Prepress-solvent	42.2	44.5

TABLE 20.--EFFECT OF CHANGE IN SIZE OF ANNUAL CRUSH ON PROCESSING COSTS PER TON OF COTTONSEED PROCESSED, BY TYPE OF COTTONSEED OIL MILL, 1955-56

Size of annual crush (tons)	Size of mill		Length of season	Processing cost (total cost minus seed)	Savings in cost	
	Presses	Seed crushed per 24 hours			Percentage decrease	Proportion of total savings
	HYDRAULIC					
	Number	*Tons*	*Months*	*Dollars*	*Percent*	*Percent*
10,600.....	6	60	8.0	30.556	0	0
13,200.....	8	80	7.5	28.354	7.2	23.0
21,100.....	8	80	12.0	25.212	17.5	55.8
26,400.....	10	100	12.0	24.071	21.2	67.7
42,200.....	16	160	12.0	22.323	26.9	85.9
52,800.....	20	200	12.0	21.951	28.2	89.8
63,400.....	24	240	12.0	21.219	30.6	97.4
79,200.....	30	300	12.0	21.346	30.1	96.1
105,600.....	40	400	12.0	20.974	31.4	100.0
	SCREW-PRESS					
10,600.....	2	75	6.4	29.683	0	0
13,200.....	2	75	8.0	27.672	6.8	22.5
21,100.....	3	100	9.6	25.044	15.6	51.8
26,400.....	3	100	12.0	23.510	20.8	68.9
42,200.....	5	175	11.0	22.194	25.2	83.6
52,800.....	6	200	12.0	21.398	27.9	92.5
63,400.....	8	250	11.5	21.178	28.7	95.0
79,200.....	10	300	12.0	20.834	29.8	98.8
105,600.....	13	400	12.0	20.729	30.2	100.0
	DIRECT-SOLVENT					
10,600.....	Plant 1	50	9.6	32.263	0	0
13,200.....	Plant 1	50	12.0	29.714	7.9	23.7
21,100.....	Plant 2	100	9.6	26.669	17.3	51.9
26,400.....	Plant 2	100	12.0	24.970	22.6	67.7
42,200.....	Plant 3	200	9.6	23.629	26.8	80.2
52,800.....	Plant 3	200	12.0	22.542	30.1	90.2
63,400.....	Plant 4	300	9.6	22.648	29.8	89.3
79,200.....	Plant 4	300	12.0	21.749	32.6	97.6
105,600.....	Plant 5	400	12.0	21.491	33.4	100.0
	PREPRESS-SOLVENT					
10,600.....	Plant 2	80	6.0	33.433	0	0
13,200.....	Plant 2	80	7.5	30.813	7.8	23.0
21,100.....	Plant 2	80	12.0	27.205	18.6	54.7
26,400.....	Plant 3	160	7.5	26.443	20.9	61.4
42,200.....	Plant 3	160	12.0	23.879	28.6	84.0
52,800.....	Plant 4	240	10.0	23.548	29.6	86.9
63,400.....	Plant 4	240	12.0	22.615	32.4	95.1
79,200.....	Plant 5	400	9.0	22.850	31.7	93.0
105,600.....	Plant 5	400	12.0	22.057	34.0	100.0

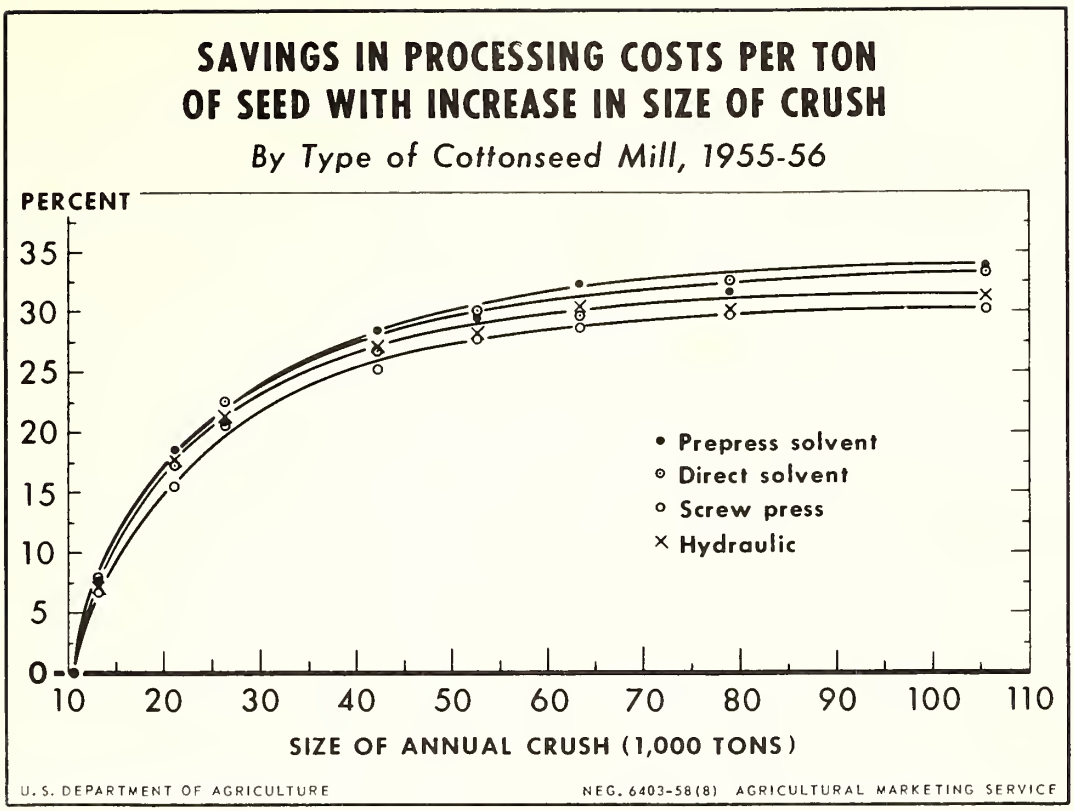

Figure 4

In comparison to the prepress-solvent, the screw-press type gained from 6.5 to 14.1 pounds of oil per ton of seed and the direct-solvent 2.2 pounds. Thus the total revenue advantage of the prepress-solvent mill over these types was decreased.

Increases in processing costs since 1949-50 are shown in table 21. Costs calculated for 5 of the 6 mill areas in MRR No. 54 were averaged and compared with those for 1955-56.[7]

For hydraulic mills, increases in costs ranged from 15 to 20 percent; for screw-press mills, from 17 to 21 percent; for direct-solvents, from 21 to 22 percent; and for prepress-solvents, from 23 to 27 percent. Usually, the biggest increase was at the crush of 10,600 tons, and the smallest increase at 63,000 tons or above.

The proportion of savings in processing costs by size of crush for all types of mills remained about the same. However, the differences in costs between types of mills changed considerably. The difference in costs between hydraulic and screw-press mills was smaller at all crushes than in 1949-50. For example, at 10,600 tons in 1949-50, processing costs were 90 cents higher for hydraulic than screw-press mills, whereas in 1955-56 these costs were only 87 cents higher. But the differences in costs between screw-press and both types of solvent mills were larger in 1955-56 than in 1949-50. The difference for the prepress-solvent type was the biggest. At 10,600 tons in 1949-50, processing costs for the prepress-solvent mill were $1.95 higher per ton than for the screw-press mill. In 1955-56, these costs were $3.75 per ton higher, an increase of $1.80 per ton.

Thus, the differences in costs and revenues between the types of mills in 1949-50 and 1955-56 accounted for changes in the most profitable type of mill for the specified annual crushes.

[7] Mill area III (south delta, Louisiana) was not included in the average, as some of the costs for this area were peculiar to this particular mill locality.

TABLE 21.--COMPARISON OF PROCESSING COSTS IN 1949-50 AND 1955-56 FOR DIFFERENT TYPES OF COTTONSEED OIL MILLS, BY SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY

Type of mill	Seed crushed per 24 hours	Length of season	Processing costs per ton of seed[1]			
			[2] 1949-50	1955-56	Increase from 1949-50 to 1955-56	
					Amount	Percentage
	ANNUAL CRUSH: 10,600 TONS					
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Percent*
Hydraulic: 6-press	60	8.0	25.375	30.556	5.181	20.4
Screw-press: 2-press	75	6.4	24.476	29.683	5.207	21.3
Direct-solvent: Plant 1	50	9.6	26.490	32.263	5.773	21.8
Prepress-solvent: Plant 2	80	6.0	26.427	33.433	7.006	26.5
	ANNUAL CRUSH: 13,200 TONS					
Hydraulic: 8-press	80	7.5	23.625	28.354	4.729	20.0
Screw-press: 2-press	75	8.0	22.873	27.672	4.799	21.0
Direct-solvent: Plant 1	50	12.0	24.574	29.714	5.140	20.9
Prepress-solvent: Plant 2	80	7.5	24.549	30.813	6.264	25.5
	ANNUAL CRUSH: 21,100 TONS					
Hydraulic: 8-press	80	12.0	21.287	25.212	3.925	18.4
Screw-press: 3-press	100	9.6	20.898	25.044	4.146	19.8
Direct-solvent: Plant 2	100	9.6	21.992	26.669	4.677	21.3
Prepress-solvent: Plant 2	80	12.0	21.890	27.205	5.315	24.3
	ANNUAL CRUSH: 26,400 TONS					
Hydraulic: 10-press	100	12.0	20.443	24.071	3.628	17.7
Screw-press: 3-press	100	12.0	19.780	23.510	3.730	18.9
Direct-solvent: Plant 2	100	12.0	20.679	24.970	4.291	20.8
Prepress-solvent: Plant 3	160	7.5	20.994	26.443	5.449	26.0
	ANNUAL CRUSH: 42,200 TONS					
Hydraulic: 16-press	160	12.0	19.221	22.323	3.102	16.1
Screw-press: 5-press	175	11.0	18.803	22.194	3.391	18.0
Direct-solvent: Plant 3	200	9.6	19.456	23.629	4.173	21.4
Prepress-solvent: Plant 3	160	12.0	19.285	23.879	4.594	23.8
	ANNUAL CRUSH: 52,800 TONS					
Hydraulic: 20-press	200	12.0	18.951	21.951	3.000	15.8
Screw-press: 6-press	200	12.0	18.193	21.398	3.205	17.6
Direct-solvent: Plant 3	200	12.0	18.654	22.542	3.888	20.8
Prepress-solvent: Plant 4	240	10.0	19.131	23.548	4.417	23.1
	ANNUAL CRUSH: 63,400 TONS					
Hydraulic: 24-press	240	12.0	18.397	21.219	2.822	15.3
Screw-press: 8-press	250	11.5	18.073	21.178	3.105	17.2
Direct-solvent: Plant 4	300	9.6	18.673	22.648	3.975	21.3
Prepress-solvent: Plant 4	240	12.0	18.410	22.615	4.205	22.8
	ANNUAL CRUSH: 79,200 TONS					
Hydraulic: 30-press	300	12.0	18.449	21.346	2.897	15.7
Screw-press: 10-press	300	12.0	17.728	20.834	3.106	17.5
Direct-solvent: Plant 4	300	12.0	17.959	21.749	3.790	21.1
Prepress-solvent: Plant 5	400	9.0	18.451	22.850	4.399	23.8
	ANNUAL CRUSH: 105,600 TONS					
Hydraulic: 40-press	400	12.0	18.040	20.974	2.934	16.3
Screw-press: 13-press	400	12.0	17.531	20.929	3.198	18.2
Direct-solvent: Plant 5	400	12.0	17.653	21.491	3.838	21.7
Prepass-solvent: Plant 5	400	12.0	17.752	22.057	4.305	24.3

[1] Processing cost equals total cost minus cost of cottonseed, f.o.b. gins.

[2] Average for 5 areas--southeastern North Carolina; north delta, Arkansas; eastern Oklahoma; north blacklands, Texas; and central California.

APPENDIX

Plant Investment Requirements

In MRR No. 54, total investment requirements were developed in a 3-step process. First, the requirements were worked out for equipment and building units used in each mill department. Second, by combining these units, total investment requirements were derived for individual mill departments. Third, combining these departments gave total investment requirements for different types and sizes of mills. This procedure is followed here.

COST OF EQUIPMENT AND BUILDING UNITS

Tables 22 through 62 show the investment requirements for building and equipment units that can be combined into an indefinite number of different sizes of hydraulic, modern screw-press, direct-solvent, and prepress-solvent cottonseed oil mills. Except for the screw-press oil-extraction department, all the tables are adjustments to 1955 price levels of similar tables in MRR No. 54 for 1949-50 price levels.[8] These tables correspond to tables 9 through 27, and 30 through 56 in MRR No. 54, with the exception of tables 10, 14, and 17. These 3 tables are not given, as their costs (for buildings for mechanical pretreatment departments, baling-press departments, and screw-press oil-extraction departments) are all increased by 20 percent and these totals are shown in tables giving total department costs.

Below the title of each table, in parenthesis, is given the corresponding table number in MRR No. 54.

In adjusting investment requirements from 1949-50 to 1955 price levels, the wholesale price indexes of the Bureau of Labor Statistics, U. S. Department of Labor, were selected as most applicable to materials and equipment costs. This selection was made after careful study of various published cost indexes. To adjust labor costs involved in construction to present levels, use was made of the ratio of 1955 to 1949 average hourly wages for skilled construction workers in 5 Southern cities. This was the same as a ratio based on the Bureau of Labor Statistics' figures.

Some equipment units (particularly for oil extraction) were repriced for 1955 by the manufacturers, and the new prices were used. Boilerroom equipment and building units were redesigned and re-estimated.

The only new cost included is that of facilities for soapstock addition to meal, shown in table 63. As previously mentioned, solvent mills are now adding soapstock to meal in order to decrease the dustiness and to facilitate pelleting. Because the point of addition and the amounts added vary, no definite plan of addition was formulated. Instead, an allowance of $14,600, included in investment costs, was assumed as sufficient for the purpose.

With only 2 exceptions, the tables are self-explanatory. The 2 exceptions are table 52, on boilerroom equipment, and table 27, on modern screw-press equipment.

Boilerroom Units: In adjusting boilerroom equipment cost to current price levels, the department was redesigned and re-estimated because it was decided that the original table did not provide enough feed water treating equipment. In the new estimate, different sizes of fuel-oil storage tanks were provided with different sizes of boilers. Besides the cost of fuel tanks and boilers, costs of boilerroom equipment units include those for feed water softeners, feed water heaters and pumps, instruments and controls, fuel pumps, heaters, piping, and insulation.

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[8] Most prices for machinery were those in effect during the first quarter of 1955. Corrections to the spring of 1955 were used whenever possible.

Sizes of boilers required by mills of different sizes were provided on the basis that boilers operating at their rated or normal capacities would meet the steam requirements of mills operating at their maximum processing rates (table 53). This means that there would be some excess steam generating capacity when mills were operating at their normal (average) daily rates. It was assumed that the overload capacity of the boilers could accommodate miscellaneous steam requirements when mills were operating at their maximum rates.

Modern Screw-Press Equipment Units: Table 27 shows costs of oil-extraction equipment units for the modern screw-press process. The screw-press machinery is described in terms of throughput rates per screw press rather than the number of screw presses. This procedure makes the data much more flexible and allows other press-room equipment (e.g., conveyors, oil handling equipment) to be selected independently of the number of screw presses.

Cooker costs were based on the assumption that 1 cooker feeds every 2 presses. The cookers are not necessarily stack cookers, because prices from the major machinery manufacturers for screw presses and for vertical and horizontal cookers were used to make composite costs for screw press and cooker.

For only 1 press in a mill, the additional costs are given in the footnote. For odd numbers of presses, the calculated costs are sufficient to provide for cooking arrangements slightly different from those for 1 cooker per 2 presses.

In all cases, the cost units or cost groups in the table include all accessory equipment for driving and supporting power-driven machinery. These groups include motors, starters, safety switches or circuit breakers, branch circuit wiring back to the main electrical feeder, sprockets, chains, sheaves, belts, supporting steel, concrete foundation, etc. More detailed descriptions of the cost units follow.

Screw press: This unit includes the screw press; prorated cost of cooker and of supports for cooker over presses; feeder from cooker to press; screw conveyor for meats, cake, overflow, and oil; piping for steam and any other services required; incremental cost of cooling system for presses.

Connecting conveyor: The conveyor running past each screw press is included in the screw-press unit. The connecting conveyor groups include the ends of these conveyors with motors and drives, starters, electrical accessories, supporting steel, etc. Elevators and all accessories to overhead conveyors are included in the connecting conveyor. The conveyor from crushing rolls past screenings tank and filter press are included. The cake conveyors to cake cooler and from cake cooler to cake bins are included.

Auxiliary equipment: These cost groups include miscellaneous electric power distribution equipment, steam condensate tank, aspiration equipment for cake conveyor, meats runaround bin and feeder, cake breaker, base cost for cooling system for screw presses, and bucket elevator for cake to cake breaker and cooler.

Oil-handling equipment: These cost groups include screenings tank and accessories, oil transfer and loading pumps, oil holding tanks, agitator for holding tanks, screw conveyor for conveying screenings tank foots to meats conveyor and for meats conveyor past the screenings tank pit, and oil piping among this equipment.

Filter press: These units include press receiving hopper for press cake and cake feeder to meats conveyor.

TOTAL PLANT INVESTMENTS

Total investments by departments are shown in table 63 for the most profitable mills of each type for the specified volumes of seed. Total investments for other mills may be obtained by use of tables 22 through 62. Increases in investment costs from 1949-50 to 1955-56 were highest for the hydraulic mills, ranging from 21 to 23 percent for different crushes. Direct-solvent mills had the smallest increases of 17 to 19 percent, while those for screw-press mills ranged from 19 to 22 percent and for prepress-solvents from 21 to 22 percent.

TABLE 22.--COSTS OF MACHINERY AND EQUIPMENT UNITS IN MECHANICAL PRETREATMENT DEPARTMENTS OF COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 9)

Machinery and equipment	Cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Seed bin--end unit (36-ton capacity)	2,890	920	3,810
Auxiliary equipment	4,480	1,400	5,880
Seed bin--center unit (36-ton capacity)	1,220	350	1,570
Auxiliary equipment	870	240	1,110
Boll reel (5' diam. by 16' long)	3,260	670	3,930
Initial auxiliary equipment	5,470	1,560	7,030
Auxiliary equipment for each reel	1,240	370	1,610
Seed cleaner (60" wide)	4,750	840	5,590
Initial auxiliary equipment	2,700	780	3,480
Auxiliary equipment for each cleaner	1,800	480	2,280
Linter (176-saw)	2,010	430	2,440
Initial auxiliary equipment	810	320	1,130
Auxiliary equipment for each linter	1,910	780	2,690
Saw-sharpening machine	4,240	480	4,720
Motes-reclaiming system	1,530	690	2,220
Initial auxiliary equipment	1,400	670	2,070
Grabbotts-reclaiming system	3,290	1,310	4,600
Initial auxiliary equipment	420	180	600
Scalping shaker (2-tray):			
48" wide	1,330	290	1,620
54" wide	1,340	290	1,630
Auxiliary equipment for each shaker	3,340	1,040	4,380
Huller and shaker:			
36" wide huller and 48" wide shaker	4,140	900	5,040
48" wide huller and 54" wide shaker	4,420	950	5,370
Initial auxiliary equipment	810	100	910
Auxiliary equipment for each huller and shaker	2,160	780	2,940
Hull beater:			
Single drum	1,160	260	1,420
Double drum	2,910	630	3,540
Initial auxiliary equipment	600	140	740
Auxiliary equipment for each beater	1,240	300	1,540
Purifier:			
36"	1,890	410	2,300
54"	1,910	430	2,340
Auxiliary equipment for each purifier	2,660	890	3,550
Hull and seed separator (66" wide)	1,320	290	1,610
Initial auxiliary equipment	2,160	500	2,660
Auxiliary equipment for each separator	1,180	540	1,720
Drive for hulling and separating machinery:			
75-horsepower	3,060	530	3,590
100-horsepower	4,010	690	4,700
125-horsepower	4,680	830	5,510
150-horsepower	5,200	900	6,100

Continued

See footnote at end of table.

TABLE 22.--COSTS OF MACHINERY AND EQUIPMENT UNITS IN MECHANICAL PRETREATMENT DEPARTMENTS OF COTTONSEED OIL MILLS, 1955-56--Continued

Machinery and equipment	Cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Crushing rolls and auxiliary equipment:			
Four 14" and one 16" diam., 36" long	12,920	2,830	15,750
Four 16" and one 18" diam., 48" long	17,430	3,820	21,250
Four 16" and one 18" diam., 60" long	19,050	4,390	23,440
One 16" and four 20" diam., 60" long	25,960	5,660	31,620
Flaking roll:			
Small	10,710	2,550	13,260
Large	15,310	3,580	18,890
Conditioner:			
3-ring high, 56" diameter	11,580	3,200	14,780
3-ring high, 72" diameter	13,550	3,620	17,170
4-ring high, 72" diameter	15,010	3,960	18,970
6-ring high, 72" diameter	18,330	4,770	23,100
6-ring high, 85" diameter	20,930	5,340	26,270

[1] Memphis, Tenn., was used as the price basing point.

TABLE 23.--INVESTMENT REQUIREMENTS FOR MECHANICAL PRETREATMENT DEPARTMENTS FOR DIFFERENT SIZES OF HYDRAULIC, SCREW-PRESS, AND PREPRESS-SOLVENT COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 11)

Item	Cost of machinery unit[1]	6-press hydraulic plant		Prepress-sol., plant 2[2] or 75 TPD screw-press plant or 8-press hyd. plant		100 TPD screw-press plant or 10-press hyd. plant		Prepress-sol., plant 3[2] or 16-press hyd. plant		175 TPD screw-press plant or 18-press hyd. plant	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dol.	No.	Dol.	No.	Dol.	No.	Dol.	No.	Dol.	No.	Dol.
Seed bin--end unit	3,810	1	3,810	1	3,810	1	3,810	1	3,810	1	3,810
Auxiliary equipment	5,880	1	5,880	1	5,880	1	5,880	1	5,880	1	5,880
Seed bin--center unit	1,570	1	1,570	1	1,570	1	1,570	2	3,140	3	4,710
Auxiliary equipment	1,110	1	1,110	1	1,110	1	1,110	2	2,220	3	3,330
Boll reel	3,930	1	3,930	1	3,930	1	3,930	2	7,860	2	7,860
Initial auxiliary equipment	7,030	1	7,030	1	7,030	1	7,030	1	7,030	1	7,030
Auxiliary equipment for each reel	1,610	1	1,610	1	1,610	1	1,610	2	3,220	2	3,220
Seed cleaner	5,590	1	5,590	1	5,590	2	11,180	2	11,180	3	16,770
Initial auxiliary equipment	3,480	1	3,480	1	3,480	1	3,480	1	3,480	1	3,480
Auxiliary equipment for each cleaner	2,280	1	2,280	1	2,280	2	4,560	2	4,560	3	6,840
Linter	2,440	12	29,280	16	39,040	20	48,800	32	78,080	36	87,840
Initial auxiliary equipment	1,130	1	1,130	1	1,130	1	1,130	1	1,130	1	1,130
Auxiliary equipment for each linter	2,690	12	32,280	16	43,040	20	53,800	32	86,080	36	96,840
Saw-sharpening machine	4,720	1	4,720	2	9,440	2	9,440	3	14,160	4	18,880
Motes-reclaiming system	2,220	1	2,220	1	2,220	1	2,220	1	2,220	1	2,220
Initial auxiliary equipment	2,070	1	2,070	1	2,070	1	2,070	1	2,070	1	2,070
Grabbots-reclaiming system	4,600	---	---	---	---	1	4,600	1	4,600	1	4,600
Initial auxiliary equipment	600	---	---	---	---	1	600	1	600	1	600
Scalping shaker (2-tray):											
48" wide	1,620	1	1,620	1	1,620	1	1,620	---	---	---	---
54" wide	1,630	---	---	---	---	---	---	1	1,630	1	1,630
Auxiliary equipment for each shaker	4,380	1	4,380	1	4,380	1	4,380	1	4,380	1	4,380
Huller and shaker:											
36" wide huller and 48" wide shaker	5,040	---	---	---	---	2	10,080	---	---	---	---
48" wide huller and 54" wide shaker	5,370	1	5,370	1	5,370	---	---	2	10,740	3	16,110
Initial auxiliary equipment	910	1	910	1	910	1	910	1	910	1	910
Auxiliary equipment for each huller and shaker	2,940	1	2,940	1	2,940	2	5,880	2	5,880	3	8,820
Hull beater:											
Double drum	3,540	1	3,540	1	3,540	1	3,540	2	7,080	2	7,080
Initial auxiliary equipment	740	1	740	1	740	1	740	1	740	1	740
Auxiliary equipment for each beater	1,540	1	1,540	1	1,540	1	1,540	2	3,080	2	3,080
Purifier:											
36"	2,300	---	---	---	---	1	2,300	---	---	---	---
54"	2,340	---	---	---	---	---	---	1	2,340	1	2,340
Auxiliary equipment for each purifier	3,550	---	---	---	---	1	3,550	1	3,550	1	3,550
Hull and seed separator	1,610	1	1,610	1	1,610	2	3,220	2	3,220	3	4,830
Initial auxiliary equipment	2,660	1	2,660	1	2,660	1	2,660	1	2,660	1	2,660
Auxiliary equipment for each separator	1,720	1	1,720	1	1,720	2	3,440	2	3,440	3	5,160
Drive for hulling and separating machinery:											
75-horsepower	3,590	1	3,590	---	---	---	---	---	---	---	---
100-horsepower	4,700	---	---	1	4,700	---	---	---	---	---	---
125-horsepower	5,510	---	---	---	---	1	5,510	1	5,510	---	---
150-horsepower	6,100	---	---	---	---	---	---	---	---	1	6,100
Crushing rolls and auxiliary equipment:											
Four 16" and one 18" diameter, 48" long	21,250	1	21,250	1	21,250	---	---	---	---	---	---
Four 16" and one 18" diameter, 60" long	23,440	---	---	---	---	---	---	2	46,880	2	46,880
One 16" and four 20" diameter, 60" long	31,620	---	---	---	---	1	31,620	---	---	---	---
Cost of machinery and equipment (total)			159,860		186,210		247,810		343,360		391,380
Delivered			125,660		146,530		194,740		269,490		307,650
Installation			34,200		39,680		53,070		73,870		83,730
Cost of building (total)			28,588		34,253		39,337		50,369		55,481
Delivered materials			21,479		26,054		30,110		38,971		43,054
Construction			7,109		8,199		9,227		11,398		12,427
Automatic sprinkler			5,755		6,475		7,041		8,054		8,755
Total cost of building, machinery, and equipment[3]			194,203		226,938		294,188		401,783		455,616

See footnotes at end of table.

Continued

TABLE 23.--INVESTMENT REQUIREMENTS FOR MECHANICAL PRETREATMENT DEPARTMENTS FOR DIFFERENT SIZES OF HYDRAULIC, SCREW-PRESS, AND PREPRESS-SOLVENT COTTONSEED OIL MILLS, 1955--Continued

Item	200 TPD screw-press plant or 20-press hyd. plant		Prepress sol., plant 4[2] or 24-press hyd. plant		250 TPD screw-press plant		300 TPD screw-press plant or 30-press hyd. plant		Prepress sol., plant 5[2] or 400 TPD screw-press plant or 40-press hyd. plant	
	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	No.	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*
Seed bin--end unit	1	3,810	1	3,810	1	3,810	1	3,810	1	3,810
Auxiliary equipment	1	5,880	1	5,880	1	5,880	1	5,880	1	5,880
Seed bin--center unit	3	4,710	4	6,280	4	6,280	4	6,280	4	6,280
Auxiliary equipment	3	3,330	4	4,440	4	4,440	4	4,440	4	4,440
Boll reel	2	7,860	3	11,790	3	11,790	4	15,720	4	15,720
Initial auxiliary equipment	1	7,030	1	7,030	1	7,030	2	14,060	2	14,060
Auxiliary equipment for each reel	2	3,220	3	4,830	3	4,830	4	6,440	4	6,440
Seed cleaner	3	16,770	3	16,770	4	22,360	4	22,360	6	33,540
Initial auxiliary equipment	1	3,480	1	3,480	1	3,480	2	6,960	2	6,960
Auxiliary equipment for each cleaner	3	6,840	3	6,840	4	9,120	4	9,120	6	13,680
Linter	40	97,600	48	117,120	50	122,000	60	146,400	80	195,200
Initial auxiliary equipment	1	1,130	1	1,130	1	1,130	2	2,260	2	2,260
Auxiliary equipment for each linter	40	107,600	48	129,120	50	134,500	60	161,400	80	215,200
Saw-sharpening machine	4	18,880	5	23,600	5	23,600	6	28,320	8	37,760
Motes-reclaiming system	1	2,220	1	2,220	1	2,220	2	4,440	2	4,440
Initial auxiliary equipment	1	2,070	1	2,070	1	2,070	1	2,070	1	2,070
Grabbots-reclaiming system	1	4,600	1	4,600	1	4,600	2	9,200	2	9,200
Initial auxiliary equipment	1	600	1	600	1	600	1	600	1	600
Scalping shaker (2-tray):										
48" wide	---	---	---	---	---	---	2	3,240	---	---
54" wide	1	1,630	1	1,630	1	1,630	---	---	2	3,260
Auxiliary equipment for each shaker	1	4,380	1	4,380	1	4,380	2	8,760	2	8,760
Huller and shaker:										
36" wide huller and 48" wide shaker	---	---	---	---	---	---	---	---	---	---
48" wide huller and 54" wide shaker	3	16,110	3	16,110	4	21,480	4	21,480	6	32,220
Initial auxiliary equipment	1	910	1	910	1	910	2	1,820	2	1,820
Auxiliary equipment for each huller and shaker	3	8,820	3	8,820	4	11,760	4	11,760	6	17,640
Hull beater:										
Double drum	2	7,080	3	10,620	3	10,620	4	14,160	4	14,160
Initial auxiliary equipment	1	740	1	740	1	740	2	1,480	2	1,480
Auxiliary equipment for each beater	2	3,080	3	4,620	3	4,620	4	6,160	4	6,160
Purifier:										
36"	---	---	---	---	2	4,600	2	4,600	---	---
54"	1	2,340	1	2,340	---	---	---	---	2	4,680
Auxiliary equipment for each purifier	1	3,550	1	3,550	2	7,100	2	7,100	2	7,100
Hull and seed separator	3	4,830	3	4,830	4	6,440	4	6,440	6	9,660
Initial auxiliary equipment	1	2,660	1	2,660	1	2,660	2	5,320	2	5,320
Auxiliary equipment for each separator	3	5,160	3	5,160	4	6,880	4	6,880	6	10,320
Drive for hulling and separating machinery:										
75-horsepower	---	---	---	---	---	---	---	---	---	---
100-horsepower	---	---	---	---	---	---	---	---	---	---
125-horsepower	---	---	---	---	---	---	2	11,020	---	---
150-horsepower	1	6,100	1	6,100	1	6,100	---	---	2	12,200
Crushing rolls and auxiliary equipment:										
Four 16" and one 18" diameter, 48" long	---	---	---	---	---	---	4	85,000	---	---
Four 16" and one 18" diameter, 60" long	---	---	3	70,320	3	70,320	---	---	---	---
One 16" and four 20" diameter, 60" long	2	63,240	---	---	---	---	---	---	4	126,480
Cost of machinery and equipment (total)		428,260		494,400		529,980		644,980		838,800
Delivered		337,150		388,720		416,720		507,570		660,930
Installation		91,110		105,680		113,260		137,410		177,870
Cost of building (total)		60,886		71,351		76,482		93,926		110,580
Delivered materials		47,375		55,733		59,836		73,555		86,909
Construction		13,511		15,618		16,646		20,371		23,671
Automatic sprinkler		9,129		10,425		10,982		12,206		14,316
Total cost of building, machinery, and equipment[3]		498,275		576,176		617,444		751,112		963,696

[1] From table 22.
[2] For size of mill in tons crushed per 24 hours for prepress solvent plants, see table 1.
[3] Memphis, Tenn., pricing point.

TABLE 24.--INVESTMENT REQUIREMENTS FOR MECHANICAL PRETREATMENT DEPARTMENTS FOR DIFFERENT SIZES (TPD)[1] OF DIRECT-SOLVENT COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 12)

Item	Cost of machinery unit[2]	Plant 1 (40-65 TPD[1])		Plant 2 (75-125 TPD[1])		Plant 3 (150-250 TPD)		Plant 4 (225-375 TPD)		Plant 5 (300-500 TPD)	
		Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost	Unit	Total cost
	Dollars	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Seed bin--end unit	3,810	1	3,810	1	3,810	1	3,810	1	3,810	1	3,810
Auxiliary equipment	5,880	1	5,880	1	5,880	1	5,880	1	5,880	1	5,880
Seed bin--center unit	1,570			1	1,570	3	4,710	4	6,280	4	6,280
Auxiliary equipment	1,110			1	1,110	3	3,330	4	4,440	4	4,440
Boll reel	3,930	1	3,930	1	3,930	2	7,860	4	15,720	4	15,720
Initial auxiliary equipment	7,030	1	7,030	1	7,030	1	7,030	2	14,060	2	14,060
Auxiliary equipment for each reel	1,610	1	1,610	1	1,610	2	3,220	4	6,440	4	6,440
Seed cleaner	5,590	1	5,590	2	11,180	3	16,770	4	22,360	6	33,540
Initial auxiliary equipment	3,480	1	3,480	1	3,480	1	3,480	2	6,960	2	6,960
Auxiliary equipment for each cleaner	2,280	1	2,280	2	4,560	3	6,840	4	9,120	6	13,680
Linter	2,440	10	24,400	20	48,800	40	97,600	60	146,400	80	195,200
Initial auxiliary equipment	1,130	1	1,130	1	1,130	1	1,130	2	2,260	2	2,260
Auxiliary equipment for each linter	2,690	10	26,900	20	53,800	40	107,600	60	161,400	80	215,200
Saw-sharpening machine	4,720	1	4,720	2	9,440	4	18,880	6	28,320	8	37,760
Motes-reclaiming system	2,220	1	2,220	1	2,220	1	2,220	2	4,440	2	4,440
Initial auxiliary equipment	2,070	1	2,070	1	2,070	1	2,070	1	2,070	1	2,070
Grabbots-reclaiming system	4,600			1	4,600	1	4,600	2	9,200	2	9,200
Initial auxiliary equipment	600			1	600	1	600	1	600	1	600
Scalping shaker (2 tray):											
48" wide	1,620	1	1,620	1	1,620	1	1,620	2	3,240	2	3,240
Auxiliary equipment for each shaker	4,380	1	4,380	1	4,380	1	4,380	2	8,760	2	8,760
Huller and shaker:											
36" wide huller and 48" wide shaker	5,040	1	5,040	2	10,080						
48" wide huller and 54" wide shaker	5,370					3	16,110	4	21,480	6	32,220
Initial auxiliary equipment	910	1	910	1	910	1	910	2	1,820	2	1,820
Auxiliary equipment for each huller and shaker	2,940	1	2,940	2	5,880	3	8,820	4	11,760	6	17,640
Hull beater--double drum	3,540	1	3,540	1	3,540	2	7,080	4	14,160	4	14,160
Initial auxiliary equipment	740	1	740	1	740	1	740	2	1,480	2	1,480
Auxiliary equipment for each beater	1,540	1	1,540	1	1,540	2	3,080	4	6,160	4	6,160
Purifier:											
36"	2,300			1	2,300			2	4,600		
54"	2,340					1	2,340			2	4,680
Auxiliary equipment for each purifier	3,550			1	3,550	1	3,550	2	7,100	2	7,100
Hull and seed separator	1,610	1	1,610	2	3,220	3	4,830	4	6,440	6	9,660
Initial auxiliary equipment	2,660	1	2,660	1	2,660	1	2,660	2	5,320	2	5,320
Auxiliary equipment for each separator	1,720	1	1,720	2	3,440	3	5,160	4	6,880	6	10,320
Drive for hulling and separating machinery:											
75-horsepower	3,590	1	3,590								
125-horsepower	5,510			1	5,510			2	11,020		
150-horsepower	6,100					1	6,100			2	12,200
Flaking roll:											
Small	13,260	1	13,260								
Large	18,890			1	18,890	2	37,780	3	56,670	4	75,560
Conditioner:											
3-ring high, 56" diameter	14,780	1	14,780								
3-ring high, 72" diameter	17,170			1	17,170						
4-ring high, 72" diameter	18,970					1	18,970				
6-ring high, 72" diameter	23,100							1	23,100		
6-ring high, 85" diameter	26,270									1	26,270
Cost of machinery and equipment (total)			153,380		252,250		421,760		639,750		814,130
Delivered			120,310		197,640		330,850		502,110		639,240
Installation			33,070		54,610		90,910		137,640		174,890
Cost of building (total)			28,588		39,337		60,886		93,926		110,580
Materials			21,479		30,110		47,375		73,555		86,909
Construction			7,109		9,227		13,511		20,371		23,671
Automatic sprinkler			5,704		7,041		9,129		12,206		14,316
Total cost of building and machinery[3]			187,672		298,628		491,775		745,882		939,026

[1] Tons per day.
[2] From table 22.
[3] Memphis, Tenn., pricing point.

TABLE 25.--COSTS OF MACHINERY AND EQUIPMENT UNITS IN BALING-PRESS DEPARTMENTS OF COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 13)

Machinery and equipment	Cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Baling press--double box	11,500	1,970	13,470
Auxiliary equipment for first press	3,010	900	3,910
Auxiliary equipment for second press	910	760	1,670
Auxiliary equipment for third press	3,110	1,170	4,280
Dual product linters bin (6 x 6 x 7 feet)	4,150	650	4,800
Additional foot in length	80	20	100
Single product linters bin	90	270	360

[1] Memphis, Tenn., was used as the price basing point.

TABLE 26.--INVESTMENT REQUIREMENTS FOR BALING-PRESS DEPARTMENTS OF DIFFERENT SIZES OF COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 15)

Cost item	Cost of mach. unit[1]	4- to 6-press hyd. plant or direct-sol.-plant[1] or prepress-sol.-plant 1[2]		8-press hyd. plant or 75 TPD screw-press plant or prepress-sol. plant 2[2]		10-press hyd. plant or 100 TPD screw-press plant or direct-sol. plant 2[2]		16-press hyd. plant or prepress-sol. plant 3[2]	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Baling press--double box	13,470	1	13,470	1	13,470	1	13,470	1	13,470
Auxiliary equipment for-									
1st press	3,910	1	3,910	1	3,910	1	3,910	1	3,910
2d press	1,670	---	---	---	---	---	---	---	---
3d press	4,280	---	---	---	---	---	---	---	---
Dual product linters bin	4,800	1	4,800	1	4,800	1	4,800	1	4,800
Additional foot in length	100	---	---	2	200	5	500	11	1,100
Single product linters bin	360	---	---	---	---	---	---	---	---
Cost of machinery and equipment (total)	---	---	22,180	---	22,380	---	22,680	---	23,280
Delivered	---	---	18,660	---	18,820	---	19,060	---	19,540
Installation	---	---	3,520	---	3,560	---	3,620	---	3,740
Cost of building (total)	---	---	8,412	---	8,412	---	8,412	---	8,412
Delivered materials	---	---	4,919	---	4,919	---	4,919	---	4,919
Construction	---	---	3,493	---	3,493	---	3,493	---	3,493
Total cost of building, machinery, and equipment[3]	---	---	30,592	---	30,792	---	31,092	---	31,692

Cost item	Cost of mach. unit[1]	18- to 22-press hyd. plant or 175 to 200 TPD screw-press plant or direct-sol. plant 3[2]		24-press hyd. plant or pre-press-sol. plant 4[2]		250 TPD screw-press plant		30-press hyd. plant or 300 TPD screw-press plant or direct-sol. plant 4[2]		36- to 40-press hyd. plant or 400 TPD screw-press plant or direct-sol. plant 5 or pre-press-sol. plant 5[2]	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Baling press--double box	13,470	2	26,940	2	26,940	2	26,940	2	26,940	3	40,410
Auxiliary equipment for-											
1st press	3,910	1	3,910	1	3,910	1	3,910	1	3,910	1	3,910
2d press	1,670	1	1,670	1	1,670	1	1,670	1	1,670	1	1,670
3d press	4,280	---	---	---	---	---	---	---	---	1	4,280
Dual product linters bin	4,800	---	---	1	4,800	1	4,800	1	4,800	---	---
Additional foot in length	100	---	---	10	1,000	11	1,100	14	1,400	---	---
Single product linters bin	360	1	360	---	---	---	---	---	---	1	360
Cost of machinery and equipment (total)	---	---	32,880	---	38,320	---	38,420	---	38,720	---	50,630
Delivered	---	---	27,010	---	31,870	---	31,950	---	32,190	---	41,620
Installation	---	---	5,870	---	6,450	---	6,470	---	6,530	---	9,010
Cost of building (total)	---	---	10,068	---	10,068	---	10,068	---	10,068	---	11,724
Delivered materials	---	---	5,900	---	5,900	---	5,900	---	5,900	---	6,876
Construction	---	---	4,168	---	4,168	---	4,168	---	4,168	---	4,848
Total cost of building, machinery, and equipment[3]	---	---	42,948	---	48,388	---	48,488	---	48,788	---	62,354

[1] From table 25.
[2] For size of mill in tons crushed per 24 hours for direct-solvent and prepress solvent plants, see table 1.
[3] Memphis, Tenn., pricing point.

TABLE 27.--COST OF MACHINERY AND EQUIPMENT UNITS IN OIL-EXTRACTION DEPARTMENTS OF SCREW-PRESS COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 16)

Machinery and equipment	Unit cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Screw press and auxiliary equipment	32,200	7,750	[2] 39,950
Connecting conveyor for--			
Less than 165 TPD	4,490	1,520	6,010
165 to 350 TPD	12,290	3,890	16,180
350 to 500 TPD	12,930	4,320	17,250
Auxiliary equipment for--			
Less than 165 TPD	7,880	3,220	11,100
165 to 350 TPD	8,180	3,420	11,600
350 to 500 TPD	9,560	3,750	13,310
Oil-handling equipment for--			
Less than 100 TPD	9,690	2,550	12,240
75 to 250 TPD	12,680	3,240	15,920
200 to 500 TPD	18,900	4,820	23,720
Filter press--			
24 inch	2,470	710	3,180
36 inch	4,970	1,270	6,240
42 inch	6,600	1,710	8,310

[1] Memphis, Tenn., was used as the price basing point.

[2] For 30 tons per day or less throughput per screw press. For each additional 5 tons per day, add $950 for materials and $220 for installation per press. For only 1 press in a mill, add $1,800 for materials and $270 for installation for 30 tons per day or less throughput, and $1,300 for materials and $330 for installation for every 5 tons per day above 30 tons per day throughput.

TABLE 28.--INVESTMENT REQUIREMENTS FOR OIL-EXTRACTION DEPARTMENTS OF DIFFERENT SIZES OF SCREW-PRESS COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 18)

Cost item	Cost of machinery unit[1]	Size of mill											
		1 press (50 TPD)		2 presses				3 presses (100 TPD)		4 presses			
				75 TPD		100 TPD				175 TPD		200 TPD	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Screw press and auxiliary equipment	*Dollars* [2] 39,950	*Number* 1	*Dollars* 48,540	*Number* 2	*Dollars* 84,580	*Number* 2	*Dollars* 89,260	*Number* 3	*Dollars* 123,360	*Number* 4	*Dollars* 173,840	*Number* 4	*Dollars* 178,520
Connecting conveyor for:													
Less than 165 TPD	6,010	1	6,010	1	6,010	1	6,010	1	6,010	---	---	---	---
165 to 350 TPD	16,180	---	---	---	---	---	---	---	---	1	16,180	1	16,180
350 to 500 TPD	17,250	---	---	---	---	---	---	---	---	---	---	---	---
Auxiliary equipment for:													
Less than 165 TPD	11,100	1	11,100	1	11,100	1	11,100	1	11,100	---	---	---	---
165 to 350 TPD	11,600	---	---	---	---	---	---	---	---	1	11,600	1	11,600
350 to 500 TPD	13,310	---	---	---	---	---	---	---	---	---	---	---	---
Oil-handling equipment for:													
Less than 100 TPD	12,240	1	12,240	1	12,240	---	---	---	---	---	---	---	---
75 to 250 TPD	15,920	---	---	---	---	1	15,920	1	15,920	1	15,920	1	15,920
200 to 500 TPD	23,720	---	---	---	---	---	---	---	---	---	---	---	---
Filter press:													
24-inch	3,180	1	3,180	---	---	---	---	---	---	---	---	---	---
36-inch	6,240	---	---	1	6,240	1	6,240	1	6,240	---	---	---	---
42-inch	8,310	---	---	---	---	---	---	---	---	1	8,310	1	8,310
Cost of machinery and equipment (total)	---	---	81,070	---	120,170	---	128,530	---	162,630	---	225,850	---	230,530
Delivered	---	---	63,730	---	95,230	---	102,020	---	129,470	---	179,950	---	183,750
Installation	---	---	17,340	---	24,940	---	26,510	---	33,160	---	45,900	---	46,780
Cost of building	---	---	11,026	---	16,028	---	16,028	---	16,098	---	16,187	---	16,187
Automatic sprinkler	---	---	574	---	1,010	---	1,010	---	1,010	---	1,010	---	1,010
Total cost of building, machinery, and equipment[3]	---	---	92,670	---	137,208	---	145,568	---	179,738	---	243,047	---	247,727

Cost item	Cost of machinery unit[1]	Size of mill											
		5 presses						6 presses					
		175 TPD		200 TPD		250 TPD		200 TPD		250 TPD		300 TPD	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Screw press and auxiliary equipment	*Dollars* [2] 39,950	*Number* 5	*Dollars* 205,600	*Number* 5	*Dollars* 211,450	*Number* 5	*Dollars* 223,150	*Number* 6	*Dollars* 246,720	*Number* 6	*Dollars* 253,740	*Number* 6	*Dollars* 267,780
Connecting conveyor for:													
Less than 165 TPD	6,010	---	---	---	---	---	---	---	---	---	---	---	---
165 to 350 TPD	16,180	1	16,180	1	16,180	1	16,180	1	16,180	1	16,180	1	16,180
350 to 500 TPD	17,250	---	---	---	---	---	---	---	---	---	---	---	---
Auxiliary equipment for:													
Less than 165 TPD	11,100	---	---	---	---	---	---	---	---	---	---	---	---
165 to 350 TPD	11,600	1	11,600	1	11,600	1	11,600	1	11,600	1	11,600	1	11,600
350 to 500 TPD	13,310	---	---	---	---	---	---	---	---	---	---	---	---
Oil-handling equipment for:													
Less than 100 TPD	12,240	---	---	---	---	---	---	---	---	---	---	---	---
75 to 250 TPD	15,920	1	15,920	1	15,920	---	---	1	15,920	---	---	---	---
200 to 500 TPD	23,720	---	---	---	---	1	23,720	---	---	1	23,720	1	23,720
Filter press:													
24-inch	3,180	---	---	---	---	---	---	---	---	---	---	---	---
36-inch	6,240	---	---	---	---	2	12,480	---	---	2	12,480	---	---
42-inch	8,310	1	8,310	1	8,310	---	---	1	8,310	---	---	2	16,620
Cost of machinery and equipment (total)	---	---	257,610	---	263,460	---	287,130	---	298,730	---	317,720	---	335,900
Delivered	---	---	205,500	---	210,250	---	229,310	---	238,650	---	253,910	---	268,570
Installation	---	---	52,110	---	53,210	---	57,820	---	60,080	---	63,810	---	67,330
Cost of building	---	---	15,675	---	15,675	---	15,675	---	20,775	---	20,775	---	20,775
Automatic sprinkler	---	---	1,010	---	1,010	---	1,010	---	1,419	---	1,419	---	1,419
Total cost of building, machinery, and equipment[3]	---	---	274,295	---	280,145	---	303,815	---	320,924	---	339,914	---	358,094

See footnotes at end of table.

Continued

TABLE 28.--INVESTMENT REQUIREMENTS FOR OIL-EXTRACTION DEPARTMENTS OF DIFFERENT SIZES OF SCREW-PRESS COTTONSEED OIL MILLS, 1955-56--Continued

Cost item	Cost of machinery unit[1]	Size of mill															
		7 presses				8 presses						9 presses					
		250 TPD		300 TPD		250 TPD		300 TPD		400 TPD		300 TPD		400 TPD			
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost		
Screw press and auxiliary equipment	*Dollars* [2]39,950	*No.* 7	*Dollars* 287,840	*No.* 7	*Dollars* 304,220	*No.* 8	*Dollars* 319,600	*No.* 8	*Dollars* 338,320	*No.* 8	*Dollars* 357,040	*No.* 9	*Dollars* 370,080	*No.* 9	*Dollars* 391,140		
Connecting conveyor for:																	
Less than 165 TPD	6,010	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
165 to 350 TPD	16,180	1	16,180	1	16,180	1	16,180	1	16,180			1	16,180	---	---		
350 to 500 TPD	17,250	---	---	---	---	---	---	---	---	1	17,250	---	---	1	17,250		
Auxiliary equipment for:																	
Less than 165 TPD	11,100	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
165 to 350 TPD	11,600	1	11,600	1	11,600	1	11,600	1	11,600	---	---	1	11,600	---	---		
350 to 500 TPD	13,310	---	---	---	---	---	---	---	---	1	13,310	---	---	1	13,310		
Oil-handling equipment for:																	
Less than 100 TPD	12,240	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
75 to 250 TPD	15,920	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
200 to 500 TPD	23,720	1	23,720	1	23,720	1	23,720	1	23,720	1	23,720	1	23,720	1	23,720		
Filter press:																	
24-inch	3,180	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
36-inch	6,240	2	12,480	---	---	2	12,480	---	---	---	---	---	---	---	---		
42-inch	8,310	---	---	2	16,620	---	---	2	16,620	2	16,620	2	16,620	2	16,620		
Cost of machinery and equipment (total)	---	---	351,820	---	372,340	---	383,580	---	406,440	---	427,940	---	438,200	---	462,040		
Delivered[3]	---	---	281,360	---	297,920	---	306,910	---	325,370	---	342,590	---	350,920	---	370,040		
Installation	---	---	70,460	---	74,420	---	76,670	---	81,070	---	85,350	---	87,280	---	92,000		
Cost of building	---	---	20,907	---	20,907	---	21,670	---	21,670	---	21,670	---	26,616	---	26,616		
Automatic sprinkler	---	---	1,419	---	1,419	---	1,419	---	1,419	---	1,419	---	1,817	---	1,817		
Total cost of building, machinery, and equipment[3]	---	---	374,146	---	394,666	---	406,669	---	429,529	---	451,029	---	466,633	---	490,473		

Cost item	Cost of machinery unit[1]	Size of mill									
		10 presses				11 presses (400 TPD)		12 presses (400 TPD)		13 presses (400 TPD)	
		300 TPD		400 TPD							
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Screw press and auxiliary equipment	*Dollars* [2]39,950	*No.* 10	*Dollars* 399,500	*No.* 10	*Dollars* 422,900	*No.* 11	*Dollars* 452,320	*No.* 12	*Dollars* 493,440	*No.* 13	*Dollars* 419,350
Connecting conveyor for:											
Less than 165 TPD	6,010	---	---	---	---	---	---	---	---	---	---
165 to 350 TPD	16,180	1	16,180	---	---	---	---	---	---	---	---
350 to 500 TPD	17,250	---	---	1	17,250	1	17,250	1	17,250	1	17,250
Auxiliary equipment for:											
Less than 165 TPD	11,100	---	---	---	---	---	---	---	---	---	---
165 to 350 TPD	11,600	1	11,600	---	---	---	---	---	---	---	---
350 to 500 TPD	13,310	---	---	1	13,310	1	13,310	1	13,310	1	13,310
Oil-handling equipment for:											
Less than 100 TPD	12,240	---	---	---	---	---	---	---	---	---	---
75 to 250 TPD	15,920	---	---	---	---	---	---	---	---	---	---
200 to 500 TPD	23,720	1	23,720	1	23,720	1	23,720	1	23,720	1	23,720
Filter press:											
24-inch	3,180	---	---	---	---	---	---	---	---	---	---
36-inch	6,240	---	---	---	---	---	---	---	---	---	---
42-inch	8,310	2	16,620	2	16,620	2	16,620	2	16,620	2	16,620
Cost of machinery and equipment (total)	---	---	467,620	---	493,800	---	523,220	---	564,340	---	590,250
Delivered	---	---	374,570	---	395,590	---	419,240	---	452,390	---	473,190
Installation	---	---	93,050	---	98,210	---	103,980	---	111,950	---	117,060
Cost of building	---	---	27,074	---	27,074	---	27,079	---	27,701	---	27,709
Automatic sprinkler	---	---	1,817	---	1,817	---	1,817	---	1,817	---	1,817
Total cost of building, machinery, and equipment[3]	---	---	496,511	---	522,691	---	552,116	---	593,858	---	619,776

[1] From table 27.

[2] For 30 tons per day or less throughput per press. For each additional 5 tons per day, add $950 for materials and $220 for installation per press. For only 1 press in a mill, add $1,800 for materials and $270 for installation for 30 tons per day or less throughput, and $1,300 materials and $330 installation for every 5 tons per day above 30 tons per day throughput.

[3] Memphis, Tenn., pricing point.

TABLE 29.--COSTS OF SPECIFIED COOKER-PRESS COMBINATIONS AND BUILDING REQUIREMENTS FOR OIL-EXTRACTION DEPARTMENTS OF HYDRAULIC COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 19)

Combination of cooker and corresponding minimum even number of presses	Cooker-press combination cost			Building cost			Total cost[1]
	Delivered	Installation	Total	Delivered	Construction	Total	
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1 cooker - 4 presses.....	73,323	18,363	91,686	13,358	8,891	22,249	113,935
1 cooker - 6 presses.....	97,858	23,635	121,493	13,375	8,891	22,266	143,759
1 cooker - 10 presses.....	127,912	30,570	158,482	13,406	8,893	22,299	180,781
1 cooker - 12 presses.....	147,532	34,545	182,077	12,886	8,830	21,716	203,793
2 cookers - 14 presses.....	196,974	46,304	243,278	17,826	11,800	29,626	272,904
2 cookers - 18 presses.....	233,878	54,747	288,625	17,852	11,801	29,653	318,278
2 cookers - 22 presses.....	269,663	62,687	332,350	17,936	11,806	29,742	362,092
4 cookers - 26 presses.....	380,706	89,396	470,102	33,520	20,792	54,312	524,414
4 cookers - 34 presses.....	453,634	106,283	559,917	33,668	20,800	54,468	614,385
1 additional press (15-box)	6,638	1,560	8,198	---	---	---	8,198

[1] Memphis, Tenn., was used as the price basing point.

TABLE 30.--INVESTMENT REQUIREMENTS FOR OIL-EXTRACTION DEPARTMENTS OF DIFFERENT SIZES OF HYDRAULIC COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 20)

Size of mill (number of presses)	Cooker-press combination[1]	Additional presses to cooker-press combination[1]	Building section[1]	Automatic sprinklers	Total cost[2]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
4.....	91,686	---	22,249	1,817	115,752
6.....	121,493	---	22,266	1,817	145,576
8.....	121,493	16,396	22,266	1,817	161,972
10.....	158,482		22,299	1,817	182,598
12.....	182,077	---	21,716	1,817	205,610
14.....	243,278	---	29,626	2,559	275,463
16.....	243,278	16,396	29,626	2,559	291,859
18.....	288,625		29,653	2,559	320,837
20.....	288,625	16,396	29,653	2,559	337,233
22.....	332,350		29,742	2,559	364,651
24.....	332,350	16,396	29,742	2,559	381,047
28.....	470,102	16,396	54,312	4,744	545,554
30.....	470,102	32,792	54,312	4,744	561,950
32.....	470,102	49,188	54,312	4,744	578,346
36.....	559,917	16,396	54,468	4,744	635,525
40.....	559,917	49,188	54,468	4,744	668,317

[1] From table 29.
[2] Memphis, Tenn., pricing point.

TABLE 31--COSTS OF MACHINERY AND EQUIPMENT UNITS AND BUILDING REQUIREMENTS FOR OIL-EXTRACTION DEPARTMENTS OF PREPRESS-SOLVENT COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 21)

Item	Cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Prepress and auxiliary equipment	39,220	9,330	48,550
Conveyor ends for prepress	4,880	1,630	6,510
Filter press:			
24"	2,470	710	3,180
36"	4,970	1,270	6,240
42"	6,600	1,710	8,310
Oil-handling equipment for			
1 to 2 prepresses	9,030	2,430	11,460
3 and 5 prepresses	11,790	3,040	14,830
Cake preparation equipment for			
1 prepress	7,380	2,530	9,910
2 prepresses	9,480	3,060	12,540
3 and 5 prepresses	11,510	3,640	15,150
Flaking roll:			
Small	10,710	2,550	13,260
Large	15,310	3,580	18,890
Auxiliary equipment for			
1-prepress section	770	360	1,130
2-prepress section	1,540	350	1,890
3-prepress section	1,800	340	2,140
5-prepress section	1,750	450	2,200
Solvent extraction unit for			
1 prepress	115,580	38,740	154,320
1 prepress	159,460	49,520	208,980
2 prepresses	189,030	57,590	246,620
3 prepresses	253,460	74,730	328,190
5 prepresses	314,240	93,560	407,800
Building for prepressing operation for			
1 prepress	11,390	4,660	[2] 16,050
2 prepresses	10,740	4,590	[2] 15,330
3 prepresses	11,300	4,660	[2] 15,960
5 prepresses	15,240	5,680	20,920

[1] Memphis, Tenn., was used as the price basing point.

[2] These buildings are of the same size. Principal difference in cost is owing to the number of fire hydrants included.

TABLE 32.--INVESTMENT REQUIREMENTS OF OIL-EXTRACTION DEPARTMENTS OF DIFFERENT SIZES (TPD)[1] OF PREPRESS-SOLVENT COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 22)

Cost item	Cost of machinery unit[2]	Size of mill									
		Plant 1 (30 to 50 TPD)		Plant 2 (60 to 100 TPD)		Plant 3 (120 to 200 TPD)		Plant 4 (180 to 300 TPD)		Plant 5 (270 to 450 TPD)	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
	Dollars	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
Prepress and auxiliary equipment...	48,550	1	48,550	1	48,550	2	97,100	3	145,650	5	242,750
Conveyor ends for prepresses.....	6,510	1	6,510	1	6,510	1	6,510	1	6,510	1	6,510
Filter press:											
24".....	3,180	1	3,180	1	3,180	---	---	---	---	---	---
36".....	6,240	---	---	---	---	1	6,240	1	6,240	---	---
42".....	8,310	---	---	---	---	---	---	---	---	1	8,310
Oil-handling equipment for--											
1 to 2 prepresses.....	11,460	1	11,460	1	11,460	1	11,460	---	---	---	---
3 and 5 prepresses.....	14,830	---	---	---	---	---	---	1	14,830	1	14,830
Cake preparation equipment for--											
1 prepress.....	9,910	1	9,910	1	9,910	---	---	---	---	---	---
2 prepresses.....	12,540	---	---	---	---	1	12,540	---	---	---	---
3 and 5 prepresses.....	15,150	---	---	---	---	---	---	1	15,150	1	15,150
Flaking roll:											
Small.....	13,260	1	13,260	1	13,260	---	---	---	---	---	---
Large.....	18,890	---	---	---	---	1	18,890	2	37,780	2	37,780
Auxiliary equipment for--											
1-prepress section.....	1,130	1	1,130	1	1,130	---	---	---	---	---	---
2-prepress section.....	1,890	---	---	---	---	1	1,890	---	---	---	---
3-prepress section.....	2,140	---	---	---	---	---	---	1	2,140	---	---
5-prepress section.....	2,200	---	---	---	---	---	---	---	---	1	2,200
Solvent extraction unit for--											
1 prepress (30 to 50 TPD).....	154,320	1	154,320	---	---	---	---	---	---	---	---
1 prepress (60 to 100 TPD).....	208,980	---	---	1	208,980	---	---	---	---	---	---
2 prepresses (120 to 200 TPD)....	246,620	---	---	---	---	1	246,620	---	---	---	---
3 prepresses (180 to 300 TPD)....	328,190	---	---	---	---	---	---	1	328,190	---	---
5 prepresses (270 to 450 TPD)....	407,800	---	---	---	---	---	---	---	---	1	407,800
Cost of machinery and equipment (total).....	---	---	248,320	---	302,980	---	401,250	---	556,490	---	735,330
Delivered.....	---	---	190,040	---	233,920	---	312,680	---	436,690	---	577,490
Installation.....	---	---	58,280	---	69,060	---	88,570	---	119,800	---	157,840
Cost of building for prepress machinery.....	---	---	16,050	---	16,050	---	15,330	---	15,960	---	20,920
Automatic sprinkler system.....	---	---	1,157	---	1,157	---	1,157	---	1,157	---	1,560
Deluge sprinkler system.....	---	---	28,442	---	36,799	---	37,834	---	41,270	---	42,347
Total cost of building, machinery, and equipment[3].....	---	---	293,969	---	356,986	---	455,571	---	614,877	---	800,157

[1] Tons per day.
[2] From table 31.
[3] Memphis, Tenn., pricing point.

TABLE 33.--INVESTMENT REQUIREMENTS FOR SOLVENT-EXTRACTION DEPARTMENTS OF DIFFERENT SIZES OF DIRECT-SOLVENT COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 23)

Size of mill[1]	Extraction unit			Deluge sprinkler system	Total cost[2]
	De-livered	Instal-lation	Total		
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Plant 1 (40 to 65 TPD).....	146,090	52,890	198,980	36,799	235,779
Plant 2 (75 to 125 TPD).....	199,390	70,460	269,850	37,834	307,684
Plant 3 (150 to 250 TPD).....	256,860	88,700	345,560	41,270	386,830
Plant 4 (225 to 375 TPD).....	305,620	103,450	409,070	42,347	451,417
Plant 5 (300 to 500 TPD).....	341,140	114,970	456,110	48,853	504,963

[1] TPD means tons per day.
[2] Memphis, Tenn. was used as the price basing point.

TABLE 34.--COSTS OF CRACKED CAKE OR MEAL BIN UNITS AND CAKE COOLERS FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54 table 24)

Cost Item	Symbol[1]	Storage capacity		Cost[2]				
		Cracked cake	Meal	Bin[3]	Machin-ery[4]	Build-ing[3]	Automatic sprin-klers	Total
	Code	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
4 bins.....	Ca	122	107	6,550	14,010	4,590	950	26,100
8 bins.....	Cb	244	214	11,770	17,710	6,310	1,360	37,150
12 bins.....	Cc	366	321	16,990	21,410	8,040	1,790	48,230
16 bins.....	Cd	488	421	22,210	25,110	9,760	2,130	59,210
Bin cooling system[5]	Ce				870			870
Cake cooler:[6]								
One-high.....	Cf				8,140			8,140
Two-high.....	Cg				13,650			13,650
Three-high.....	Ch				19,030			19,030

[1] The symbols identify the cost items.
[2] Memphis, Tenn., was used as price basing point.
[3] Installation cost approximately 30 percent of total cost.
[4] Installation cost approximately 23 percent of total cost.
[5] This fan and piping for cooling cake in bins. Costs are for a unit to serve 4 bins. Installation cost approximately 24 percent of total cost.
[6] Costs are for rotary air-cooled cooler which may be used instead of the bin cooling system. Maximum and normal cake cooling capacity may be considered to be equivalent to 200 and 160 tons per day of seed per cooler stack. Installation cost approximately 22 percent of total cost.

TABLE 35.--INVESTMENT REQUIREMENTS FOR CRACKED CAKE OR MEAL BIN UNITS AND CAKE COOLERS FOR COTTONSEED OIL MILLS, by type and size of mill, 1955-56

(MRR No. 54, table 25)

Type and size of mill (tons crushed per day at normal operating rate)	Symbol[1]	Maximum storage capacity required (cracked cake for meal)[2]	Total cost[3]
Hydraulic mills:	*Code*	*Tons*	*Dollars*
40 to 100	Ca,Ce	122	26,970
110 to 200	Cb,Ce,Ce	244	38,890
210 to 300	Cc,Ce,Ce,Ce	366	50,840
310 to 400	Cd,Ce,Ce,Ce,Ce	488	62,690
Screw-press mills:			
50 to 100	Ca,Cf	122	34,240
110 to 200	Cb,Cq	244	50,800
210 to 300	Cc,Cq	366	61,880
310 to 400	Cd,Ch	488	78,240
Direct- and prepress-solvent mills:			
40 to 100	Ca	107	26,100
110 to 200	Cb	214	37,150
210 to 300	Cc	321	48,230
310 to 400	Cd	421	59,210

[1] The symbol column identifies the combinations of machinery units (from table 34) that make up total costs.
[2] Based on 2-1/2 days' cracked cake or meal production.
[3] Memphis, Tenn., pricing point.

TABLE 36.--COSTS OF MACHINERY AND EQUIPMENT UNITS AND BUILDING REQUIREMENTS FOR CAKE-PROCESSING DEPARTMENTS OF COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 26)

Unit	Symbol[1]	Cost						
		Machinery and equipment			Building installed	Fire hydrants installed	Automatic sprinklers installed	Total[2]
		Delivered	Installation	Total				
Cake or meal grinding and bagging machinery	*Code* Cg	*Dollars* 24,550	*Dollars* 5,650	*Dollars* 30,200	*Dollars* 6,080	*Dollars* 1,180	*Dollars* 670	*Dollars* 38,130
Pellet manufacture and bagging machinery	Pm	16,750	4,390	21,140	5,740	---	670	27,550
Pneumatic cake conveyor	Pc	9,510	4,240	13,750	---	---	---	13,750

[1] The symbols identify the cake processing units.
[2] Memphis, Tenn., was used as the price basing point.

TABLE 37.--INVESTMENT REQUIREMENTS FOR CAKE-PROCESSING DEPARTMENTS OF COTTONSEED OIL MILLS, BY TYPE OF MILL, 1955-56

(MRR No. 54, table 27)

Type of mill	Symbol[1]	Total cost[2]
	Code	*Dollars*
Direct-solvent	Cq, Pm	65,680
Prepress-solvent	Cq, Pm	65,680
Screw-press	Cq, Pm, Pc	79,430
Hydraulic	Cq, Pm, Pc	79,430

[1] The symbol column identifies the combinations of cake-processing units (from table 36) that make up total costs.
[2] Memphis, Tenn., pricing point.

TABLE 38.--COSTS OF MACHINERY AND BUILDING UNITS FOR SEED STORAGE HOUSES FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 30)

Unit	Machinery and equipment		Building[1]	Yard improvements		Total[2]
	Delivered	Installation		Delivered	Installation	
Minimum length--first house:[3]	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
60 feet wide	7,570	3,170	24,610	2,500	1,490	39,340
90 feet wide	8,390	3,570	40,040	3,540	2,230	57,770
Minimum length--additional house:						
60 feet wide	7,570	3,170	24,610	2,230	1,310	38,890
90 feet wide	8,390	3,570	40,040	3,230	1,970	57,200
Center section for first house:						
60 feet wide	950	350	6,570	320	130	8,320
90 feet wide	950	350	8,110	400	170	9,980
Center section for additional house:						
60 feet wide	950	350	6,570	290	110	8,270
90 feet wide	950	350	8,110	370	140	9,920
Pneumatic unloader	2,730	680				3,410
Auxiliary equipment for each unloader	4,620	1,370	---	---	---	5,990
Auxiliary equipment for rail-truck unloader	350	---	---	---	---	350
Cooling fan	1,610	360	---	---	---	1,970
Auxiliary equipment for each fan	680	160	---	---	---	840
Fire hydrant and hose house	530	60	---	---	---	590

[1] Includes installation charges.
[2] Memphis, Tenn., was used as the price basing point.
[3] Any size house may be obtained by adding "center section" units to "minimum length house."

TABLE 39.--UNIT REQUIREMENTS AND TOTAL COSTS OF SEED STORAGE HOUSES OF DIFFERENT SIZES FOR SPECIFIED BUILDING MACHINERY, AND EQUIPMENT UNITS OF COTTONSEED OIL MILLS, 1955-56[1]

(MRR No. 54, table 31)

Building, machinery, and equipment unit	Cost of unit[2]	70' by 60' (1,400-ton capacity)				90' by 60' (1,850-ton capacity)				110' by 60' (2,350-ton capacity)				100' by 90' (3,700-ton capacity)			
		(Code-Sa) First house		(Code-Saa) Additional house		(Code-Sb) First house		Code-Sbb) Additional house		(Code-Sc) First house		(Code Scc) Additional house		(Code-Sd) First house		(Code-Sdd) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Minimum length--first house:[3]	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
60 feet wide	39,340	1	39,340	---	---	1	39,340	---	---	1	39,340	---	---	---	---	---	---
90 feet wide	57,770	---	---	---	---	---	---	---	---	---	---	---	---	1	57,770	---	---
Minimum length--additional house:																	
60 feet wide	38,890	---	---	1	38,890	---	---	1	38,890	---	---	1	38,890	---	---	---	---
90 feet wide	57,200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	57,200
Center section for first house:																	
60 feet wide	8,320	---	---	---	---	1	8,320	---	---	2	16,640	---	---	---	---	---	---
90 feet wide	9,980	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Center section for additional house:																	
60 feet wide	8,270	---	---	---	---	---	---	1	8,270	---	---	2	16,540	---	---	---	---
90 feet wide	9,920	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pneumatic unloader	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410
Auxiliary equipment	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990
Auxiliary equipment for rail-truck unloader	350	1	350	---	---	1	350	---	---	1	350	---	---	1	350	---	---
Cooling fan	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970
Auxiliary equipment for each fan	840	1	840	1	840	1	840	1	840	1	840	1	840	1	840	1	840
Fire hydrant and hose house	590	4	2,360	2	1,180	4	2,360	2	1,180	6	3,540	3	1,770	4	2,360	2	1,180
Automatic sprinkler	---	---	3,190	---	---	---	3,190	---	---	---	3,232	---	---	---	3,190	---	1,177
Total cost of building, machinery, and equipment[4]	---	---	57,450	---	52,280	---	65,770	---	60,550	---	75,312	---	69,410	---	75,880	---	71,767

Building, machinery, and equipment unit	Cost of unit[2]	120' by 90' (4,600-ton capacity)				140' by 90' (5,450-ton capacity)				160' by 90' (6,300-ton capacity)				180' by 90' (7,200-ton capacity)			
		(Code-Se) First house		(Code-See) Additional house		(Code-Sf) First house		(Code-Sff) Additional house		(Code-Sg) First house		(Code--Sgg) Additional house		(Code-Sh) First house		(Code--Shh) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Minimum length--first house:[3]	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
60 feet wide	39,340	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	57,770	1	57,770	---	---	1	57,770	---	---	1	57,770	---	---	1	57,770	---	---
Minimum length--additional house:						---	---	---	---	---	---	---	---	---	---	---	---
60 feet wide	38,890	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	57,200	---	---	1	57,200	---	---	1	57,200	---	---	1	57,200	---	---	1	57,200
Center section for first house:																	
60 feet wide	8,320	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	9,980	1	9,980	---	---	2	19,960	---	---	3	29,940	---	---	4	39,920	---	---
Center section for additional house:																	
60 feet wide	8,270	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	9,920	---	---	1	9,920	---	---	2	19,840	---	---	3	29,760	---	---	4	39,680
Pneumatic unloader	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410
Auxiliary equipment	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990
Auxiliary equipment for rail-truck unloader	350	1	350	---	---	1	350	---	---	1	350	---	---	1	350	---	---
Cooling fan	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970	1	1,970
Auxiliary equipment for each fan	840	1	840	1	840	1	840	1	840	1	840	1	840	1	840	1	840
Fire hydrant and hose house	590	6	3,540	3	1,770	6	3,540	3	1,770	6	3,540	3	1,770	6	3,540	3	1,770
Automatic sprinkler	---	---	3,190	---	1,177	---	3,445	---	1,431	---	3,635	---	1,621	---	3,810	---	1,798
Total cost of building, machinery, and equipment[4]	---	---	87,040	---	82,277	---	97,275	---	92,451	---	107,445	---	102,561	---	117,600	---	112,658

See footnotes at end of table.

Continued

TABLE 39.--UNIT REQUIREMENTS AND TOTAL COSTS OF SEED STORAGE HOUSES OF DIFFERENT SIZES FOR SPECIFIED BUILDING, MACHINERY, AND EQUIPMENT UNITS OF COTTONSEED OIL MILLS, 1955-56[1]--Continued

Building, machinery, and equipment unit	Cost of unit[2]	200' by 90' (8,050-ton capacity)				220' by 90' (8,950-ton capacity)				240' by 90' (9,800-ton capacity)			
		(Code-Si) First house		(Code-Sii) Additional house		(Code-Sj) First house		(Code-Sjj) Additional house		(Code-Sk) First house		(Code-Skk) Additional house	
		Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
Minimum length--first house:[3]	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*
60 feet wide	39,340	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	57,770	1	57,770	---	---	1	57,770	---	---	1	57,770	---	---
Minimul length--additional house:													
60 feet wide	38,890	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	57,200	---	---	1	57,200	---	---	1	57,200	---	---	1	57,200
Center section for first house:													
60 feet wide	7,370	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	9,980	5	49,900	---	---	6	59,880	---	---	7	69,860	---	---
Center section for additional house:													
60 feet wide	8,270	---	---	---	---	---	---	---	---	---	---	---	---
90 feet wide	9,920	---	---	5	49,600	---	---	6	59,520	---	---	7	69,440
Pneumatic unloader	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410	1	3,410
Auxiliary equipment	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,990	1	5,999
Auxiliary equipment for rail-truck unloader	350	1	350	---	---	1	350	---	---	1	350	---	---
Cooling fan	1,970	2	3,940	2	3,940	2	3,940	2	3,940	2	3,940	2	3,940
Auxiliary equipment for each fan	840	2	1,680	2	1,680	2	1,680	2	1,680	2	1,680	2	1,680
Fire hydrant and hose house	590	6	3,540	3	1,770	6	3,540	3	1,770	6	3,540	3	1,770
Automatic sprinkler	---	---	3,989	---	2,067	---	4,162	---	2,241	---	4,330	---	2,409
Total cost of building, machinery, and equipment[4]	---	---	130,569	---	125,657	---	140,722	---	135,751	---	150,870	---	145,839

[1] The codes identify the storage houses.
[2] From table 38.
[3] Any size house may be obtained by adding "center section" units to the "minimum length" house.
[4] Memphis, Tenn., pricing point.

TABLE 40.--INVESTMENT REQUIREMENTS OF SEED STORAGE HOUSES FOR COTTONSEED OIL MILLS, AT SPECIFIED VOLUMES OF SEED CRUSHED ANNUALLY, 1955-56

(MRR No. 54, table 32)

Type of mill	Size of mill, seed crushed per day at normal operating rate	Length of operating season[1]	Maximum seed storage capacity required	Symbol of each house[2]												Total houses	Cost (Memphis Tenn. pricing point)
				Sd	Sf	Sg	Sh	Si	Sj	Sk	Sdd	Sff	Shh	Sjj	Skk		
	ANNUAL CRUSH: 10,600 TONS																
	Tons	*Months*	*Tons*													*Number*	*Dollars*
Prepress-solvent: Plant 2.....	80	6.0	3,300	1												1	75,880
Direct-solvent: Plant 1.....	50	9.6	5,350		1											1	97,275
Screw-press: 2-press.....	75	6.4	3,600	1												1	75,880
Hydraulic: 6-press.....	60	8.0	4,700		1											1	97,275
	ANNUAL CRUSH: 13,200 TONS																
Direct-solvent: Plant 1.....	50	12.0	7,600					1								1	130,569
Prepress-solvent: Plant 2.....	80	7.5	5,450		1											1	97,275
Screw-press: 2-press.....	75	8.0	5,800			1										1	107,445
Hydraulic: 8-press.....	80	7.5	5,450		1											1	97,275
	ANNUAL CRUSH: 21,100 TONS																
Prepress-solvent: Plant 2.....	80	12.0	12,200				1					1				2	210,051
Direct-solvent: Plant 2.....	100	9.6	10,750				1				1					2	189,367
Screw-press: 3-press.....	100	9.6	10,750				1				1					2	189,367
Hydraulic: 8-press.....	80	12.0	12,200				1					1				2	210,051
	ANNUAL CRUSH: 26,400 TONS																
Direct-solvent: Plant 2.....	100	12.0	15,200					1					1			2	243,227
Prepress-solvent: Plant 3.....	160	7.5	10,900				1				1					2	189,367
Screw-press: 3-press.....	100	12.0	15,200					1					1			2	243,227
Hydraulic: 10-press.....	100	12.0	15,200					1					1			2	243,227
	ANNUAL CRUSH: 42,200 TONS																
Prepress-solvent: Plant 3.....	160	12.0	24,400						1				1	1		3	389,131
Direct-solvent: Plant 3.....	200	9.6	21,500				1						2			3	342,916
Screw-press: 5-press.....	175	11.0	23,300						1				2			3	366,038
Hydraulic: 16-press.....	160	12.0	24,400						1				1	1		3	389,131
	ANNUAL CRUSH: 52,800 TONS																
Direct-solvent: Plant 3.....	200	12.0	30,500						1				[4] 3			4	480,708
Prepress-solvent: Plant 4.....	240	10.0	27,600						[3] 1					2		3	431,772
Screw-press: 6-press.....	200	12.0	30,500						1				[4] 3			4	480,708
Hydraulic: 20-press.....	200	12.0	30,500						1				[4] 3			4	480,708
	ANNUAL CRUSH: 63,400 TONS																
Prepress-solvent: Plant 4.....	240	12.0	36,600							1			1		[4] 2	4	557,127
Direct-solvent: Plant 4.....	300	9.6	32,250						1				[4] 2	1		4	503,710
Screw-press: 8-press.....	250	11.5	35,850							1			1		[4] 2	4	557,127
Hydraulic: 24-press.....	240	12.0	36,600							1			1		[4] 2	4	557,127
	ANNUAL CRUSH: 79,200 TONS																
Direct-solvent: Plant 4.....	300	12.0	45,700							1			1		[4] 3	5	702,966
Prepress-solvent: Plant 5.....	400	9.0	38,500							[3] 1					[4] 3	4	599,708
Screw-press: 10-press.....	300	12.0	45,700							1			1		[4] 3	5	702,966
Hydraulic: 30-press.....	300	12.0	45,700							1			1		[4] 3	5	702,966
	ANNUAL CRUSH: 105,600 TONS																
Prepress-solvent: Plant 5.....	400	12.0	61,000							1			2	2	[5] 2	7	943,208
Direct-solvent: Plant 5.....	400	12.0	61,000							1			2	2	[5] 2	7	943,208
Screw-press: 13-press.....	400	12.0	61,000							1			2	2	[5] 2	7	943,208
Hydraulic: 40-press.....	400	12.0	61,000							1			2	2	[5] 2	7	943,208

[1] Averaging 22 24-hour working days per month.
[2] The symbol columns represent the storagehouses (from table 39) that make up total costs.
[3] 1 pneumatic unloader added to house.
[4] For a combination of 4 to 6 houses, the sprinkler cost of the first house was used with the first additional house.
[5] For a combination of 7 to 8 houses, the sprinkler cost of the first house was used with the first 2 additional houses.

TABLE 41.--DESCRIPTION AND COSTS OF BUILDING AND EQUIPMENT UNITS IN MEAL STORAGE HOUSES FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 33)

Description of unit	Bagged meal or slab cake storage provision[1]	Cost[2]		
		Delivered	Construction	Total
Building--50 feet wide:[3]	*Tons*	*Dollars*	*Dollars*	*Dollars*
End section--10 feet long	68	2,410	1,720	4,130
Center section--10 feet long	68	900	680	1,580
Doors and dock--2 doors and 10-foot section unroofed dock (for loading bays)	---	700	360	1,060
Continuous dock--roofed:				
End section--20 feet long	---	580	550	1,130
Center section--10 feet long	---	200	190	390
Fire cutoff and fire door	---	350	290	640
Fire hydrant and hose house	---	530	60	590

[1] Bagged meal (100 pounds per bag) stacked 12 bags high.
[2] Memphis, Tenn., pricing point.
[3] Varying building sizes may be obtained by adding "center section" units to "ends section."

TABLE 42.--UNIT REQUIREMENTS AND TOTAL COSTS OF MEAL STORAGE HOUSES FOR COTTONSEED OIL MILLS, BY SIZE OF HOUSE, 1955-56

(MRR 54, table 34)

Size of house[1]	Building symbol[2]	Storage capacity	Building-ends section cost[3]	Building-center section		Doors and dock		Continuous dock-end section cost[3]	Continuous dock-center section		Fire cutoff and fire door cost[3]	Fire hydrant and hose house		Automatic sprinkler system cost	Total cost[4]
				Unit	Cost[3]	Unit	Cost[3]		Unit	Cost[3]		Unit	Cost[3]		
	Code	*Tons*	*Dollars*	*No.*	*Dollars*	*No.*	*Dollars*	*Dollars*	*No.*	*Dollars*	*Dollars*	*No.*	*Dollars*	*Dollars*	*Dollars*
40 by 40 feet[5]	Ma	156	---	---	---	---	---	---	---	---	---	---	---	3,677	16,091
50 by 50 feet	Mb	272	4,130	4	6,320	1	1,060	1,130	3	1,170	640	2	1,180	4,187	19,817
60 by 50 feet	Mc	340	4,130	5	7,900	1	1,060	1,130	4	1,560	640	2	1,180	4,450	22,050
80 by 50 feet	Md	408	4,130	7	11,060	2	2,120	1,130	6	2,340	640	2	1,180	4,953	27,553
90 by 50 feet	Me	476	4,130	8	12,640	2	2,120	1,130	7	2,730	640	2	1,180	5,211	29,781
100 by 50 feet	Mf	544	4,130	9	14,220	2	2,120	1,130	8	3,120	640	2	1,180	5,427	31,967
110 by 50 feet	Mg	612	4,130	10	15,800	2	2,120	1,130	9	3,510	640	2	1,180	5,658	34,168
120 by 50 feet	Mh	680	4,130	11	17,380	2	2,120	1,130	10	3,900	640	2	1,180	5,894	36,374
140 by 50 feet	Mi	748	4,130	13	20,540	3	3,180	1,130	12	4,680	640	2	1,180	6,284	41,764
150 by 50 feet	Mj	816	4,130	14	22,120	3	3,180	1,130	13	5,070	640	2	1,180	6,440	43,890
160 by 50 feet	Mk	884	4,130	15	23,700	3	3,180	1,130	14	5,460	640	2	1,180	6,696	46,116
170 by 50 feet	Ml	952	4,130	16	25,280	3	3,180	1,130	15	5,850	640	2	1,180	6,871	48,261
180 by 50 feet	Mm	1,020	4,130	17	26,860	3	3,180	1,130	16	6,240	640	2	1,180	7,071	50,431
210 by 50 feet	Mn	1,156	4,130	20	31,600	4	4,240	1,130	19	7,410	640	4	2,360	7,789	59,299
230 by 50 feet	Mo	1,292	4,130	22	34,760	4	4,240	1,130	21	8,190	640	4	2,360	7,968	63,418
260 by 50 feet	Mp	1,428	4,130	25	39,500	5	5,300	1,130	24	9,360	640	4	2,360	8,635	71,055
280 by 50 feet	Mq	1,564	4,130	27	42,660	5	5,300	1,130	26	10,140	640	4	2,360	9,212	75,572
300 by 50 feet	Mr	1,700	4,130	29	45,820	5	5,300	1,130	28	10,920	640	4	2,360	9,435	79,735

[1] Varying building sizes obtained by adding "building-center section" units to "building ends section."

[2] The symbols identify the sizes of houses.

[3] Unit costs of building-ends section, building-center section, doors and dock, continuous dock-ends section, fire cutoff and fire door, fire hydrant and hose house were $4,130, $1,580, $1,060, $1,130, $390, $640, and $590, respectively.

[4] Memphis, Tenn., pricing point.

[5] This 40-foot building was included to provide a smaller warehouse than the minimum practical length of 50-foot building would provide; only the total cost for the 40-foot building was available.

TABLE 43.--INVESTMENT REQUIREMENTS OF MEAL STORAGE HOUSES FOR COTTONSEED OIL MILLS, BY SIZE OF MILL, 1955-56

(MRR No. 54, table 35)

Size of mill (tons crushed per day at normal operating rate)	Maximum meal storage capacity required[1]	Building symbol[2]	Cost[3]
	Tons	*Code*	*Dollars*
50 to 80	172 to 275	Mb	19,817
100	344	Mc	22,050
160	550	Mf	31,967
175	601	Mg	34,168
200	687	Mh	36,374
240	825	Mj	43,890
250	859	Mk	46,116
300	1,031	Mn	59,299
400	1,375	Mp	71,055

[1] Based on 7 days' bagged meal production.
[2] The symbol column identifies the sizes of houses (from table 42) for which total costs are given.
[3] Memphis, Tenn., pricing point.

TABLE 44.--DESCRIPTION AND COSTS OF BUILDING AND EQUIPMENT UNITS OF STORAGE HOUSES FOR BALED LINTERS AND MISCELLANEOUS SUPPLIES FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 36)

Description of unit	Baled linters and miscellaneous supplies storage provision[1]	Cost[2]		
		Delivered	Construction	Total
Building--50 feet wide:[3]	*Bales*	*Dollars*	*Dollars*	*Dollars*
Ends section--10 feet long	112	2,410	1,720	4,130
Center section--10 feet long	112	900	680	1,580
Doors and dock--2 doors and 10-foot section unroofed dock (for loading bays)	---	700	360	1,060
Fire hydrant and hose house	---	530	60	590

[1] Stacked 4 bales high.
[2] Memphis, Tenn., pricing point.
[3] Varying building sizes may be obtained by adding "center section" units to "ends section."

TABLE 45.--UNIT REQUIREMENTS AND TOTAL COSTS OF STORAGE HOUSES FOR BALED LINTERS AND MISCELLANEOUS SUPPLIES FOR COTTONSEED OIL MILLS, BY SIZE OF HOUSE, 1955-56

(MRR No. 54, table 37)

Size of house[1]	Building Symbol[2]	Storage capacity	Building end section cost[3]	Building-center section		Doors and dock		Fire hydrant and hose house		Automatic sprinkler system cost	Total cost[4]
				Unit	Cost[3]	Unit	Cost[3]	Unit	Cost[3]		
	Code	*Bales*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Dollars*	*Dollars*
40 by 40 feet[5]	La	269	---	---	---	---	---	---	---	3,488	12,225
50 by 50 feet	Lb	448	4,130	4	6,320	1	1,060	1	590	3,970	16,070
60 by 50 feet	Lc	560	4,130	5	7,900	1	1,060	1	590	4,218	17,898
80 by 50 feet	Ld	672	4,130	7	11,060	2	2,120	1	590	4,677	22,577
90 by 50 feet	Le	784	4,130	8	12,640	2	2,120	1	590	4,886	24,366
100 by 50 feet	Lf	896	4,130	9	14,220	2	2,120	1	590	5,127	26,187
110 by 50 feet	Lg	1,008	4,130	10	15,800	2	2,120	1	590	5,313	27,953
120 by 50 feet	Lh	1,120	4,130	11	17,380	2	2,120	1	590	5,514	29,734
140 by 50 feet	Li	1,232	4,130	13	20,540	3	3,180	1	590	5,894	34,334
150 by 50 feet	Lj	1,344	4,130	14	22,120	3	3,180	1	590	6,062	36,082
160 by 50 feet	Lk	1,456	4,130	15	23,700	3	3,180	2	1,180	6,233	38,423
170 by 50 feet	Ll	1,568	4,130	16	25,280	3	3,180	2	1,180	6,441	40,211
180 by 50 feet	Lm	1,680	4,130	17	26,860	3	3,180	2	1,180	6,597	41,947
210 by 50 feet	Ln	1,904	4,130	20	31,600	4	4,240	2	1,180	7,085	48,235
230 by 50 feet	Lo	2,128	4,130	22	34,760	4	4,240	2	1,180	7,390	51,700
260 by 50 feet	Lp	2,352	4,130	25	39,500	5	5,300	2	1,180	7,886	57,996
280 by 50 feet	Lq	2,576	4,130	27	42,660	5	5,300	2	1,180	8,204	61,474
300 by 50 feet	Lr	2,800	4,130	29	45,820	5	5,300	2	1,180	8,579	65,009

[1] Varying building sizes obtained by adding "building-center section" units to "building-ends section."

[2] The symbols identify the sizes of houses.

[3] Unit costs of building-ends section, building-center section, doors and dock, and fire hydrant and hose house were $4,130, $1,580, $1,060, and $590 respectively.

[4] Memphis, Tenn., pricing point.

[5] This 40-foot building was included to provide a smaller warehouse than the minimum practical length that a 50-foot building would provide; only total cost for 40 foot building was available.

TABLE 46.--INVESTMENT REQUIREMENTS OF STORAGE HOUSES FOR BALED LINTERS AND MISCELLANEOUS SUPPLIES FOR COTTONSEED OIL MILLS, BY SIZE OF MILL, 1955-56

(MRR No. 54, table 38)

Size of mill (tons crushed per day at normal operating rate)	Maximum storage capacity required[1]	Building symbol[2]	Cost[3]
	Bales	*Code*	*Dollars*
40 to 60	360 to 430	Lb	16,070
75 to 100	495 to 565	Lc	17,898
120 to 125	635	Ld	22,577
140 to 150	700 to 740	Le	24,366
160	885	Lf	26,187
175 to 180	950	Lg	27,953
200 to 220	1,020 to 1,090	Lh	29,734
240 to 250	1,270 to 1,300	Lj	36,082
300	1,475	Ll	40,211
320	1,655	Lm	41,947
350 to 360	1,790	Ln	48,235
400	1,925	Lo	51,700

[1] Stacked 4 bales high and based on 12 days' linters production plus bagging and ties requirements as follows: Up to 160 tons per day the equivalent in linters bales of 224 bales of bagging and ties; from 160 to 240 tons per day, 336 bales; from 240 to 320 tons per day, 448 bales; and for 320 to 400 tons per day, 560 bales.

[2] The symbol column identifies the sizes of houses (from table 45) for which total costs are given.

[3] Memphis, Tenn., pricing point.

TABLE 47.--COSTS OF BUILDING AND MACHINERY UNITS IN HULL STORAGE HOUSES FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 39)

Unit	Building installed	Machinery		Yard improvements		Total[1]
		Delivered	Installation	Delivered	Installation	
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Minimum-length house--50 x 40 feet[2]	11,960	2,980	910	1,730	2,050	19,630
Center section--20 x 40 feet	3,270	340	140	115	150	4,015
Minimum-length house--70 x 60 feet[2]	16,640	4,140	1,270	2,400	2,850	27,300
Center section--20 x 60 feet	3,840	400	170	130	170	4,710
Fire hydrant and hose house	---	---	---	530	80	610

[1] Memphis, Tenn., pricing point.

[2] Varying house sizes may be obtained by adding "center section" units to minimum length house.

TABLE 48.--COST OF HULL STORAGE HOUSES FOR COTTONSEED OIL MILLS, BY SIZE OF HOUSE, 1955-56

(MRR No. 54, table 40)

Size of house	Symbol[1]	Cost[2]						
		House 40 feet wide[3]		House 60 feet wide[3]		Fire Hydrant	Automatic sprinkler system	Total
		Minimum length	Center section	Minimum length	Center section			
	Code	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
50 by 40 feet....	Ha	19,630	---	---	---	1,220	1,391	22,241
70 by 40 feet....	Hb	19,630	4,015	---	---	1,220	1,789	26,654
70 by 60 feet....	Hc	---	---	27,300	---	1,220	2,440	30,960
90 by 60 feet....	Hd	---	---	27,300	4,710	1,220	2,942	36,172
110 by 60 feet...	He	---	---	27,300	9,420	1,220	3,407	41,347
130 by 60 feet...	Hf	---	---	27,300	14,130	1,220	3,846	46,496
150 by 60 feet...	Hg	---	---	27,300	18,840	1,830	4,287	52,257
170 by 60 feet...	Hh	---	---	27,300	23,550	1,830	4,686	57,366
190 by 60 feet...	Hi	---	---	27,300	28,260	1,830	5,070	62,460
210 by 60 feet...	Hj	---	---	27,300	32,970	1,830	5,464	67,564
230 by 60 feet...	Hk	---	---	27,300	37,680	1,830	5,836	72,646
250 by 60 feet...	Hl	---	---	27,300	42,390	1,830	6,232	77,752
270 by 60 feet...	Hm	---	---	27,300	47,100	1,830	6,637	82,867
290 by 60 feet...	Hn	---	---	27,300	51,810	1,830	7,085	88,025
310 by 60 feet...	Ho	---	---	27,300	56,520	1,830	7,527	93,177

[1] The symbols identify the sizes of houses.
[2] Memphis, Tenn., pricing point.
[3] Varying house sizes may be obtained by adding "center section" units to minimum length house.

TABLE 49.--INVESTMENT REQUIREMENTS OF HULL STORAGE HOUSES FOR COTTONSEED OIL MILLS, BY SIZE OF MILL, 1955-56

(MRR No. 54, table 41)

Size of mill (tons crushed per day at normal operating rate)	Maximum hull storage capacity required[1]	Symbol[2]	Cost[3]
	Tons	*Code*	*Dollars*
40 to 110.....	110 to 270	Ha	22,241
120 to 160.....	320 to 430	Hb	26,654
170 to 260.....	460 to 700	Hc	30,960
270 to 340.....	730 to 920	Hd	36,172
350 to 400.....	940 to 1,080	He	41,347

[1] Based on 12 days' hull production, and hull yield of 450 pounds per ton of seed.
[2] The symbol column identifies the sizes of houses (from table 48) for which total costs are given.
[3] Memphis, Tenn., pricing point.

TABLE 50.--COSTS OF OIL STORAGE TANK UNITS OF DIFFERENT CAPACITIES FOR COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 42)

Tank unit[1]	Capacity	Installed cost[2]
	Pounds	*Dollars*
First	360,000	8,540
Second	630,000	10,360
Third	1,650,000	15,710

[1] Each unit includes 2 tanks of equal size, connecting piping manifold, tank foundations, and dike.
[2] Memphis, Tenn., was used as the price basing point.

TABLE 51.--INVESTMENT REQUIREMENTS OF COTTONSEED OIL STORAGE TANK UNITS FOR COTTONSEED OIL MILLS, BY TYPE AND SIZE OF MILL, 1955-56

(MRR No. 54, table 43)

Type and size of mill (tons crushed per day at normal operating rate)	Maximum oil storage requirement[1]	Cost[2]
	1,000 pounds	*Dollars*
Hydraulic mills:		
40 to 160	90 to 350	8,540
170 to 290	370 to 630	10,360
300 to 400	650 to 870	15,710
Screw-press mills:		
50 to 150	120 to 350	8,540
160 to 270	370 to 630	10,360
280 to 400	650 to 920	15,710
Direct-solvent and prepress-solvent mills:		
40 to 140	100 to 350	8,540
150 to 250	370 to 630	10,360
260 to 400	640 to 990	15,710

[1] Based on 7 days' oil production. 1 oil storage tank unit for each of the 3 ranges of oil capacities as follows: 360,000 pounds; 630,000 pounds; and 1,650,000 pounds, respectively.
[2] Memphis, Tenn., pricing point.

TABLE 52.--COST OF BOILERROOM SECTIONS OF GENERAL SERVICE ROOMS FOR COTTONSEED OIL MILLS, BY SIZE OF BOILER, 1955-56

(MRR No. 54, tables 44 and 45)

Size of boiler[1]	Boiler and auxiliary equipment cost[2]			Building-center section, 32 by 10 feet[3]		Total cost[4]
	Delivered	Installation	Total	Unit	Cost	
Hydraulic and screw-press mills:	*Dollars*	*Dollars*	*Dollars*	*Number*	*Dollars*	*Dollars*
50 BHP	7,250	2,500	9,750	2	2,880	12,630
80 BHP	8,980	3,200	12,180	2	2,880	15,060
100 BHP	11,730	4,080	15,810	2	2,880	18,690
125 BHP	12,240	4,280	16,520	2	2,880	19,400
150 BHP	14,470	5,120	19,590	2	2,880	22,470
200 BHP	17,680	6,110	23,790	2	2,880	26,670
Prepress-solvent and direct-solvent mills:						
50 BHP	7,250	2,500	9,750	2	2,880	12,630
80 BHP	9,030	3,210	12,240	2	2,880	15,120
100 BHP	11,780	4,090	15,870	2	2,880	18,750
125 BHP	12,260	4,290	16,550	2	2,880	19,430
150 BHP	15,240	5,330	20,570	2	2,880	23,450
200 BHP	18,040	6,320	24,360	2	2,880	27,240
300 BHP	25,760	8,820	34,580	3	4,320	38,900
400 BHP	32,460	11,080	43,540	3	4,320	47,860
500 BHP	33,630	11,260	44,890	3	4,320	49,210

[1] Boiler capacities are given in terms of boiler horsepower (BHP).

[2] Boilers were designed to fire either gas or oil. Fuel oil storage tanks were included in the auxiliary equipment in order that all cost units would be usable at any desired location whether or not it were served by gas. The difference between facilities for mechanical pressing and solvent processes is in capacity of equipment for feed water preparation.

[3] Total cost of $1,440 per unit, including delivered cost of $850 and installation cost of $590.

[4] Memphis, Tenn., used as the price basing point.

TABLE 53.--INVESTMENT REQUIREMENTS OF BOILERROOMS FOR COTTONSEED OIL MILLS, BY TYPE AND SIZE OF MILL, 1955-56

(MRR No. 54, table 46)

Type and size of mill[1]	Steam generating capacity required per day[2]	Steam generating capacity of boiler per day	Cost[3] investment requirement
	Boiler horsepower	*Horsepower*	*Dollars*
Hydraulic mills:			
40 to 140 tons per day	16 to 54	50	12,630
160 to 220 tons per day	62 to 86	80	15,060
240 to 280 tons per day	93 to 109	100	18,690
300 to 340 tons per day	116 to 132	125	19,400
360 to 400 tons per day	140 to 156	150	22,470
Screw-press mills:			
30 to 90 tons per day	18 to 54	50	12,630
120 tons per day	72	80	15,060
150 to 180 tons per day	91 to 109	100	18,690
210 tons per day	127	125	19,400
240 tons per day	145	150	22,470
270 to 390 tons per day	163 to 236	200	26,670
Prepress-solvent mills:			
40 tons per day	33	50	12,630
80 tons per day	66	80	15,120
160 tons per day	133	125	19,430
240 tons per day	199	200	27,240
400 tons per day	299	300	38,900
Direct-solvent mills:			
50 tons per day	60	80	15,120
100 tons per day	115	125	19,430
200 tons per day	230	300	38,900
300 tons per day	345	400	47,860
400 tons per day	460	500	49,210

[1] Size of mill is in terms of normal crushing rates for all mills except the screw-press type. For screw-press mills, size is in terms of 30 tons per press per day.

[2] Estimated capacity required is based on maximum processing rates of mills. Steam generating requirements per ton of seed per day are as follows: 0.28 boiler horsepower for hydraulic mills; 0.36 boiler horsepower for screw-press mills; 0.66 boiler horsepower for prepress-solvent mills; and 0.92 boiler horsepower for direct-solvent mills.

[3] Memphis, Tenn., pricing point.

TABLE 54.--COST OF BUILDING AND EQUIPMENT UNITS IN LOCKER ROOM SECTIONS OF GENERAL SERVICE BUILDINGS FOR COTTONSEED OIL MILLS, 1955-56[1]

(MRR No. 54, table 47)

Unit	Cost[1]		
	Delivered	Installation	Total
Building:[2]	*Dollars*	*Dollars*	*Dollars*
End section--10 x 32 feet	2,850	3,120	5,970
Center section--1 x 32 feet	103	73	176
Locker	17	4	21
Plumbing fixtures	120	130	250
Fire hydrant	530	60	590

[1] Memphis, Tenn., pricing point.

[2] Varying building sizes may be obtained by adding "center section" unit to "ends section" unit.

TABLE 55.--COST OF LOCKER ROOM SECTIONS OF GENERAL SERVICE BUILDINGS FOR COTTONSEED OIL MILLS, BY NUMBER OF MEN SERVED PER DAY, 1955-56

(MRR No. 54, table 48)

Number of men served per day	Length of 32'-wide building section[1]	Building symbol[2]	Building-end section cost	Building center section		Locker		Plumbing fixtures		Fire-hydrant cost	Unallocated cost[4]	Total cost[5]
				Unit	Cost[3]	Unit	Cost[3]	Unit	Cost[3]			
	Feet	*Code*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
9	10	L1	5,970	---	---	9	189	4	1,000	590	218	7,967
18	10	L2	5,970	---	---	18	378	4	1,000	590	218	8,156
27	25	L3	5,970	15	2,640	27	567	9	2,250	590	438	12,455
36	25	L4	5,970	15	2,640	36	756	9	2,250	590	438	12,644
45	33	L5	5,970	23	4,048	45	945	9	2,250	590	475	14,278
54	33	L6	5,970	23	4,048	54	1,134	12	3,000	590	475	15,217
63	33	L7	5,970	23	4,048	63	1,323	16	4,000	590	475	16,406
72	38	L8	5,970	28	4,928	72	1,512	16	4,000	590	475	17,475
81	38	L9	5,970	28	4,928	81	1,701	17	4,250	590	475	17,914
90	46	L10	5,970	36	6,336	90	1,890	20	5,000	590	512	20,298
99	52	L11	5,970	42	7,392	99	2,079	23	5,750	590	522	22,303
108	52	L12	5,970	42	7,392	108	2,268	23	5,750	590	522	22,492
117	57	L13	5,970	47	8,272	117	2,457	24	6,000	590	533	23,822
126	57	L14	5,970	47	8,272	126	2,646	27	6,750	590	533	24,761
135	63	L15	5,970	53	9,328	135	2,835	30	7,500	590	556	26,779
144	63	L16	5,970	53	9,328	144	3,024	30	7,500	590	556	26,968

[1] Varying building sizes may be obtained by adding "center section" units to "ends section" unit.
[2] The symbol column identifies lengths of building sections.
[3] Unit costs of building-center section, locker, and plumbing fixtures are $176, $21, and $250, respectively.
[4] Miscellaneous costs of general service building.
[5] Memphis, Tenn., pricing point.

TABLE 56.--INVESTMENT REQUIREMENTS FOR LOCKER ROOMS FOR MEN EMPLOYED AT COTTONSEED OIL MILLS, BY TYPE AND SIZE OF MILLS OPERATING AT NORMAL RATES, 1955-56

(MRR No. 54, table 49)

Type and size of mill at normal crushing rate per day	Men required per day[1]	Building symbol[2]	Cost[3]
Hydraulic:	*Number*	*Code*	*Dollars*
40 to 60 tons	30 to 36	L4	12,644
80 tons	42	L5	14,278
100 to 120 tons	48 to 51	L6	15,217
160 tons	63	L7	16,406
200 to 220 tons	78 to 81	L9	17,914
240 tons	84	L10	20,298
300 tons	102	L12	22,492
360 to 400 tons	120 to 126	L14	24,761
Screw-press:			
50 tons	25	L3	12,455
75 to 100 tons	30 to 34	L4	12,644
125 tons	37	L5	14,278
175 to 200 tons	47 to 50	L6	15,217
250 tons	60	L7	16,406
300 tons	66	L8	17,475
350 tons	77	L9	17,914
400 tons	83	L10	20,298
Direct-solvent:			
50 tons	25	L3	12,455
100 tons	34	L4	12,644
200 tons	53	L6	15,217
300 tons	70	L8	17,475
400 tons	86	L10	20,298
Prepress-solvent:			
40 to 80 tons	28 to 34	L4	12,644
160 tons	50	L6	15,217
240 tons	63	L7	16,406
400 tons	89	L10	20,298

[1] Based on number of production workers required per 24 hours.
[2] The symbol column identifies the sizes of building sections (from table 55) for which total costs are given.
[3] Memphis, Tenn., pricing point.

TABLE 57.--INVESTMENT REQUIREMENTS OF STOREROOM AND MACHINE-SHOP SECTIONS OF GENERAL SERVICE BUILDINGS FOR COTTONSEED OIL MILLS, BY SIZE OF MILL AND DESCRIPTION OF UNITS, 1955-56

(MRR No. 54, table 50)

Size of mill and description of unit	Cost[1]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Small mill[2]	29,176	7,095	36,271
Building unit	7,214	4,562	11,776
Storeroom equipment	15,433	1,051	16,484
Machine shop equipment	6,529	1,482	8,011
Medium mill[3]	48,764	11,099	59,863
Building unit	10,657	6,295	16,952
Storeroom equipment	23,706	1,560	25,266
Machine shop equipment	14,401	3,244	17,645
Large mill[4]	74,839	16,790	91,629
Building unit	14,918	8,513	23,431
Storeroom equipment	32,314	2,089	34,403
Machine shop equipment	27,607	6,188	33,795

[1] Memphis, Tenn., pricing point.
[2] Includes mills operating at 100 tons per day and less, at normal rate.
[3] Includes mills operating at 110 to 250 tons per day at normal rate.
[4] Includes mills operating at 260 to 400 tons per day at normal rate.

TABLE 58.--UNIT REQUIREMENTS AND TOTAL COSTS OF ELECTRIC POWER SUBSTATIONS OF DIFFERENT CAPACITIES FOR SPECIFIED EQUIPMENT UNITS FOR COTTONSEED OIL MILLS, 1955-56[1]

(MRR No. 54, table 51)

Equipment unit	Cost of unit[2]			3-phase power capacity at 0.85 power factor (kw.) and rated 3-phase capacity (kv.-a.)									
	Delivered	Installation	Total	255 kw. (300 kv.-a.)		425 kw. (500 kv.-a.)		640 kw. (750 kv.-a.)		850 kw. (1,000 kv.-a.)		1,060 kw. (1,250 kv.-a.)	
				Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
High-voltage transformer:	*Dol.*	*Dol.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*
100 kilovolt-amperes	1,020	190	1,210	2	2,420								
167 kilovolt-amperes	1,390	300	1,690	1	1,690	2	3,380					2	3,380
250 kilovolt-amperes	2,070	440	2,510			1	2,510	2	5,020			4	10,040
333 kilovolt-amperes	2,510	550	3,060					1	3,060	2	6,120		
500 kilovolt-amperes	3,320	750	4,070							1	4,070		
Low-voltage transformer:													
25 kilovolt-amperes	380	120	500	1	500								
50 kilovolt-amperes	590	170	760			1	760	1	760			2	1,520
75 kilovolt-amperes	780	210	990							1	990		
100 kilovolt-amperes	960	260	1,220										
Auxiliary equipment	1,220	1,230	2,450	1	2,450	1	2,450	1	2,450	1	2,450	2	4,900
Total cost					7,060		9,100		11,290		13,630		19,840
Delivered					5,030		6,660		8,460		10,340		14,680
Installation					2,030		2,440		2,830		3,290		5,160

Equipment unit	3-phase power capacity at 0.85 power factor (kw.) and rated 3-phase capacity (kv.-a.)													
	1,270 kw. (1,500 kv.-a.)		1,490 kw. (1,750 kv.-a.)		1,700 kw. (2,000 kv.-a.)		2,120 kw. (2,500 kv.-a.)		2,550 kw. (3,000 kv.-a.)		2,980 kw. (3,500 kv.-a.)		3,400 kw. (4,000 kv.-a.)	
	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost	Unit	Cost
High-voltage transformer	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*
100 kilovolt-amperes														
167 kilovolt-amperes													1	1,690
250 kilovolt-amperes	5	12,550	2	5,020					1	2,510				
333 kilovolt-amperes	1	3,060	3	9,180	5	15,300	2	6,120			4	12,240	2	6,120
500 kilovolt-amperes			1	4,070	1	4,070	4	16,280	6	24,420	5	20,350	7	28,490
Low-voltage transformer:														
25 kilovolt-amperes														
50 kilovolt-amperes	2	1,520	1	760	1	760								
75 kilovolt-amperes			1	990	1	990	1	990			3	2,970	1	990
100 kilovolt-amperes							1	1,220	2	2,440			2	2,440
Auxiliary equipment	2	4,900	2	4,900	2	4,900	2	4,900	2	4,900	3	7,350	3	7,350
Total cost		22,030		24,920		26,020		29,510		34,270		42,910		47,080
Delivered		16,480		18,800		19,680		22,480		26,350		32,640		36,010
Installation		5,550		6,120		6,340		7,030		7,920		10,270		11,070

[1] The capacity ratings of the substations do not include the single-phase power transformers which provide lighting.
[2] Memphis, Tenn., pricing point.

TABLE 59.--INVESTMENT REQUIREMENTS OF ELECTRIC SUBSTATIONS FOR COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY, 1955-56

(MRR No. 54, table 52)

Type of mill	Size of mill (seed crushed per day)	Length of operating season[1]	Maximum electric power demand required[2]	Cost[3]
	Tons	*Months*	*Kilowatts*	*Dollars*
ANNUAL CRUSH: 10,600 TONS				
Hydraulic: 6-press	60	8.0	279	9,100
Screw-press: 2-press	75	6.4	490	11,290
Direct-solvent: Plant 1	50	9.6	241	7,060
Prepress-solvent: Plant 2	80	6.0	405	9,100
ANNUAL CRUSH: 13,200 TONS				
Hydraulic: 8-press	80	7.5	339	9,100
Screw-press: 2-press	75	8.0	490	11,290
Direct-solvent: Plant 1	50	12.0	291	9,100
Prepress-solvent: Plant 2	80	7.5	405	9,100
ANNUAL CRUSH: 21,100 TONS				
Hydraulic: 8-press	80	12.0	439	11,290
Screw-press: 3-press	100	9.6	732	13,630
Direct-solvent: Plant 2	100	9.6	482	11,290
Prepress-solvent: Plant 2	80	12.0	505	11,290
ANNUAL CRUSH: 26,400 TONS				
Hydraulic: 10-press	100	12.0	548	11,290
Screw-press: 3-press	100	12.0	782	13,630
Direct-solvent: Plant 2	100	12.0	532	11,290
Prepress-solvent: Plant 3	160	7.5	811	13,630
ANNUAL CRUSH: 42,200 TONS				
Hydraulic: 16-press	160	12.0	827	13,630
Screw-press: 5-press	175	11.0	1,223	22,030
Direct-solvent: Plant 3	200	9.6	863	19,840
Prepress-solvent: Plant 3	160	12.0	911	19,840

See footnotes at end of table.

Continued

TABLE 59.--INVESTMENT REQUIREMENTS OF ELECTRIC SUBSTATIONS FOR COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY, 1955--Continued

Type of mill	Size of mill (seed crushed per day)	Length of operating season[1]	Maximum electric power demand required[2]	Cost[3]
	Tons	*Months*	*Kilowatts*	*Dollars*
ANNUAL CRUSH: 52,800 TONS				
Hydraulic: 20-press	200	12.0	1,047	19,840
Screw-press: 6-press	200	12.0	1,515	26,020
Direct-solvent: Plant 3	200	12.0	1,013	19,840
Prepress-solvent: Plant 4	240	10.0	1,316	24,920
ANNUAL CRUSH: 63,400 TONS				
Hydraulic: 24-press	240	12.0	1,166	22,030
Screw-press: 8-press	250	11.5	1,789	29,510
Direct-solvent: Plant 4	300	9.6	1,295	24,920
Prepress-solvent: Plant 4	240	12.0	1,366	24,920
ANNUAL CRUSH: 79,200 TONS				
Hydraulic: 30-press	300	12.0	1,495	26,020
Screw-press: 10-press	300	12.0	2,211	34,270
Direct-solvent: Plant 4	300	12.0	1,445	24,920
Prepress-solvent: Plant 5	400	9.0	2,077	29,510
ANNUAL CRUSH: 105,600 TONS				
Hydraulic: 40-press	400	12.0	1,993	29,510
Screw-press: 13-press	400	12.0	2,943	42,910
Direct-solvent: Plant 5	400	12.0	1,927	29,510
Prepress-solvent: Plant 5	400	12.0	2,327	34,270

[1] Averaging 22 24-hour working days per month.

[2] Based on calculations of Kilowatt power demand required during any 15-minute period for the unloading, storing and processing of seed. It was assumed that meal grinding, pelleting, or sacking would be performed during periods of low demand in such a way that the total demand for power would not be altered.

[3] Memphis, Tenn., pricing point.

TABLE 60.--COSTS OF SERVICE PIPING FOR COTTONSEED OIL MILLS, BY TYPE AND SIZE OF MILL, 1955-56

(MRR No. 54, table 53)

Type and size of mill[1]	Cost[2]		
	Delivered	Installation	Total
	Dollars	*Dollars*	*Dollars*
Hydraulic:			
Small	6,020	6,160	12,180
Medium	6,710	7,840	14,550
Large	7,880	10,110	17,990
Screw-press:			
Small	5,140	5,970	11,110
Medium	5,660	7,370	13,030
Large	6,350	9,020	15,370
Direct-solvent:			
Small	7,060	7,610	14,670
Medium	7,950	9,220	17,170
Large	9,830	11,740	21,570
Prepress-solvent:			
Small	7,060	7,610	14,670
Medium	7,950	9,220	17,170
Large	9,830	11,740	21,570

[1] Small mills crush 100 tons of cottonseed per day and less; medium mills crush 110 to 250 tons; and large mills crush 260 to 400 tons per day. All mills assumed to be operating at their normal rates.

[2] These costs cover piping requirements for steam, water, and oil lines to processing departments, sanitary water main, sewer lines, connection of fire main to municipal system, control valves in fire main, and other items of similar nature. Memphis, Tenn., was used as the price basing point.

TABLE 61.--COSTS OF MISCELLANEOUS ITEMS FOR COTTONSEED OIL MILLS, BY COST ITEM AND SIZE OF MILL, 1955-56[1]

(MRR No. 54, table 54)

Cost item and size of mill	Building			Equipment			Total[2]
	Materials	Construction	Total	Delivered	Installation	Total	
Trucks and autos for--	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Small mill	610	560	1,170	---	---	[3] 6,800	7,970
Medium mill	1,070	960	2,030	---	---	[3] 9,100	11,130
Large mill	1,540	1,360	2,900	---	---	[3] 11,400	14,300
Seed sampling unit for--							
Small mill	1,340	1,160	2,500	2,720	600	3,320	5,820
Medium mill	1,460	1,300	2,760	3,010	670	3,680	6,440
Large mill	1,580	1,420	3,000	3,370	750	4,120	7,120
Office for--							
Small mill	---	---	11,740	6,420	1,340	7,760	19,500
Medium mill	---	---	21,410	9,220	1,940	11,160	32,570
Large mill	---	---	33,800	12,820	2,690	15,510	49,310
Railroad scale and oil loading station for--							
Small mill	700	390	1,090	---	---	[4] 18,000	19,090
Medium mill	700	390	1,090	---	---	[4] 19,200	20,290
Large mill	700	390	1,090	---	---	[4] 21,600	22,690
Truck scale for--							
Small mill	---	---	---	---	---	5,500	5,500
Medium mill	---	---	---	---	---	6,050	6,050
Large mill	---	---	---	---	---	6,600	6,600
Railroad track and switches for--							
Small mill	---	---	---	---	---	37,660	37,660
Medium mill	---	---	---	---	---	44,380	44,380
Large mill	---	---	---	---	---	58,940	58,940
Sundry items for--							
Small mill	---	---	---	---	---	12,600	12,600
Medium mill	---	---	---	---	---	17,880	17,880
Large mill	---	---	---	---	---	24,000	24,000

[1] Small mills crush 100 tons and less; medium mills crush 110 to 250 tons; and large mills crush 260 to 400 tons per day. All mills assumed to be operating 24 hours per day at their normal rates.

[2] Memphis, Tenn., pricing point.

[3] Trucks and autos.

[4] Railroad scale.

TABLE 62.--COST OF FIRE-PROTECTION TANKS AND TANK-HEATING EQUIPMENT FOR HYDRAULIC AND SCREW-PRESS COTTONSEED OIL MILLS, 1955-56

(MRR No. 54, table 55)

Cost item	Installed cost[1]
	Dollars
Tank (50,000 gallons)	21,500
Heating equipment[2]	2,610
Total	24,110

[1] Memphis, Tenn., pricing point.
[2] Heating equipment to prevent freezing of noncirculating water reserve.

TABLE 63.--CALCULATED INVESTMENT REQUIREMENTS FOR DIFFERENT DEPARTMENTS OF DIFFERENT TYPES AND SIZES OF COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY, 1955-56

(MRR No. 54, table 56)

Type of mill	Seed crushed per 24 hours	Length of operating season[1]	Investment[2]				
			Processing department				
			Mechanical pretreatment	Baling press	Oil extraction	Cracked cake or meal bins	Meal grinding, pelleting and sacking
	ANNUAL CRUSH: 10,600 TONS						
	Tons	*Months*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	60	8.0	194,203	30,592	145,576	26,970	79,430
Screw-press: 2-press	75	6.4	226,938	30,792	137,208	34,240	79,430
Direct-solvent: Plant 1	50	9.6	187,672	30,592	235,779	26,100	65,680
Prepress-solvent: Plant 2	80	6.0	226,938	30,792	356,986	26,100	65,680
	ANNUAL CRUSH: 13,200 TONS						
Hydraulic: 8-press	80	7.5	226,938	30,792	161,972	26,970	79,430
Screw-press: 2-press	75	8.0	226,938	30,792	137,208	34,240	79,430
Direct-solvent: Plant 1	50	12.0	187,672	30,592	235,779	26,100	65,680
Prepress-solvent: Plant 2	80	7.5	226,938	30,792	356,986	26,100	65,680
	ANNUAL CRUSH: 21,100 TONS						
Hydraulic: 8-press	80	12.0	226,938	30,792	161,972	26,970	79,430
Screw-press: 3-press	100	9.6	294,188	31,092	179,738	34,240	79,430
Direct-solvent: Plant 2	100	9.6	298,628	31,092	307,684	26,100	65,680
Prepress-solvent: Plant 2	80	12.0	226,938	30,792	356,986	26,100	65,680
	ANNUAL CRUSH: 26,400 TONS						
Hydraulic: 10-press	100	12.0	294,188	31,092	182,598	26,970	79,430
Screw-press: 3-press	100	12.0	294,188	31,092	179,738	34,240	79,430
Direct-solvent: Plant 2	100	12.0	298,628	31,092	307,684	26,100	65,680
Prepress-solvent: Plant 3	160	7.5	401,783	31,692	455,571	37,150	65,680
	ANNUAL CRUSH: 42,200 TONS						
Hydraulic: 16-press	160	12.0	401,783	31,692	291,859	38,890	79,430
Screw-press 5-press	175	11.0	455,616	42,948	274,295	50,800	79,430
Direct-solvent: Plant 3	200	9.6	491,775	42,948	386,830	37,150	65,680
Prepress-solvent: Plant 3	160	12.0	401,783	31,692	455,571	37,150	65,680
	ANNUAL CRUSH: 52,800 TONS						
Hydraulic: 20-press	200	12.0	498,275	42,948	337,233	38,890	79,430
Screw-press: 6-press	200	12.0	498,275	42,948	320,924	50,800	79,430
Direct-solvent: Plant 3	200	12.0	491,775	42,948	386,830	37,150	65,680
Prepress-solvent: Plant 4	240	10.0	576,176	48,388	614,877	48,230	65,680
	ANNUAL CRUSH: 63,400 TONS						
Hydraulic: 24-press	240	12.0	576,176	48,388	381,047	50,840	79,430
Screw-press: 8-press	250	11.5	617,444	48,488	406,669	61,880	79,430
Direct-solvent: Plant 4	300	9.6	745,882	48,788	451,417	48,230	65,680
Prepress-solvent: Plant 4	240	12.0	576,176	48,388	614,877	48,230	65,680
	ANNUAL CRUSH: 79,200 TONS						
Hydraulic: 30-press	300	12.0	751,112	48,788	561,950	50,840	79,430
Screw-press: 10-press	300	12.0	751,112	48,788	496,511	61,880	79,430
Direct-solvent: Plant 4	300	12.0	745,882	48,788	451,417	48,230	65,680
Prepress-solvent: Plant 5	400	9.0	963,696	62,354	800,157	59,210	65,680
	ANNUAL CRUSH: 105,600 TONS						
Hydraulic: 40-press	400	12.0	963,696	62,354	668,317	62,690	79,430
Screw-press: 13-press	400	12.0	963,696	62,354	619,776	78,240	79,430
Direct-solvent: Plant 5	400	12.0	939,026	62,354	504,963	59,210	65,680
Prepress-solvent: Plant 5	400	12.0	963,696	62,354	800,157	59,210	65,680

See footnotes at end of table.

Continued

TABLE 63.--CALCULATED INVESTMENT REQUIREMENTS FOR DIFFERENT DEPARTMENTS OF DIFFERENT TYPES AND SIZES OF COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY, 1955-56--Continued

Type of mill	Investment[2]							
	Storage department					General service department		
	Seed	Sacked meal and pellets	Baled lint and miscellaneous supplies	Hulls	Cottonseed oil	Boiler room	Locker room	Storeroom and machine shop
	ANNUAL CRUSH: 10,600 TONS							
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	97,275	19,817	16,070	22,241	8,540	12,630	12,644	36,271
Screw-press: 2-press	75,880	19,817	17,898	22,241	8,540	12,630	12,644	36,271
Direct-solvent: Plant 1	97,275	19,817	16,070	22,241	8,540	15,120	12,455	36,271
Prepress-solvent: Plant 2	75,880	19,817	17,898	22,241	8,540	15,120	12,644	36,271
	ANNUAL CRUSH: 13,200 TONS							
Hydraulic: 8-press	97,275	19,817	17,898	22,241	8,540	12,630	14,278	36,271
Screw-press: 2-press	107,445	19,817	17,898	22,241	8,540	12,630	12,644	36,271
Direct-solvent: Plant 1	130,569	19,817	16,070	22,241	8,540	15,120	12,455	36,271
Prepress-solvent: Plant 2	97,275	19,817	17,898	22,241	8,540	15,120	12,644	36,271
	ANNUAL CRUSH: 21,100 TONS							
Hydraulic: 8-press	210,051	19,817	17,898	22,241	8,540	12,630	14,278	36,271
Screw-press: 3-press	189,367	22,050	17,898	22,241	8,540	12,630	12,644	36,271
Direct-solvent: Plant 2	189,367	22,050	17,898	22,241	8,540	19,430	12,644	36,271
Prepress-solvent: Plant 2	210,051	19,817	17,898	22,241	8,540	15,120	12,644	36,271
	ANNUAL CRUSH: 26,400 TONS							
Hydraulic: 10-press	243,227	22,050	17,898	22,241	8,540	12,630	15,217	36,271
Screw-press: 3-press	243,227	22,050	17,898	22,241	8,540	12,630	12,644	36,271
Direct-solvent: Plant 2	243,227	22,050	17,898	22,241	8,540	19,430	12,644	36,271
Prepress-solvent: Plant 3	189,367	31,967	26,187	26,654	10,360	19,430	15,217	59,863
	ANNUAL CRUSH: 42,200 TONS							
Hydraulic: 16-press	389,131	31,967	26,187	26,654	8,540	15,060	16,406	59,863
Screw-press: 5-press	366,038	34,168	27,953	30,960	10,360	15,060	15,217	59,863
Direct-solvent: Plant 3	342,916	36,374	29,734	30,960	10,360	38,900	15,217	59,863
Prepress-solvent: Plant 3	389,131	31,967	26,187	26,654	10,360	19,430	15,217	59,863
	ANNUAL CRUSH: 52,800 TONS							
Hydraulic: 20-press	480,708	36,374	29,734	30,960	10,360	15,060	17,914	59,863
Screw-press: 6-press	480,708	36,374	29,734	30,960	10,360	18,690	15,217	59,863
Direct-solvent: Plant 3	480,708	36,374	29,734	30,960	10,360	38,900	15,217	59,863
Prepress-solvent: Plant 4	431,772	43,890	36,082	30,960	10,360	27,240	16,406	59,863
	ANNUAL CRUSH: 63,400 TONS							
Hydraulic: 24-press	557,127	43,890	36,082	30,960	10,360	18,690	20,298	59,863
Screw-press: 8-press	557,127	46,116	36,082	30,960	10,360	22,470	16,406	59,863
Direct-solvent: Plant 4	503,710	59,299	40,211	36,172	15,710	47,860	17,475	91,629
Prepress-solvent: Plant 4	557,127	43,890	36,082	30,960	10,360	27,240	16,406	59,863
	ANNUAL CRUSH: 79,200 TONS							
Hydraulic: 30-press	702,966	59,299	40,211	36,172	15,710	19,400	22,492	91,629
Screw-press: 10-press	702,966	59,299	40,211	36,172	15,710	26,670	17,475	91,629
Direct-solvent: Plant 4	702,966	59,299	40,211	36,172	15,710	47,860	17,475	91,629
Prepress-solvent: Plant 5	599,708	71,055	51,700	41,347	15,710	38,900	20,298	91,629
	ANNUAL CRUSH: 105,600 TONS							
Hydraulic: 40-press	943,208	71,055	51,700	41,347	15,710	22,470	24,761	91,629
Screw-press: 13-press	943,208	71,055	51,700	41,347	15,710	26,670	20,298	91,629
Direct-solvent: Plant 5	943,208	71,055	51,700	41,347	15,710	49,210	20,298	91,629
Prepress-solvent: Plant 5	943,208	71,055	51,700	41,347	15,710	38,900	20,298	91,629

See footnotes at end of table.

Continued

TABLE 63.--CALCULATED INVESTMENT REQUIREMENTS FOR DIFFERENT DEPARTMENTS OF DIFFERENT TYPES AND SIZES OF COTTONSEED OIL MILLS CRUSHING SPECIFIED VOLUMES OF SEED ANNUALLY, 1955-56--Continued

Type of mill	Investment[2]				
	Electric power sub-station	Miscellaneous items[3]	Service piping	Land	Total
	ANNUAL CRUSH: 10,600 TONS				
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Hydraulic: 6-press	9,100	132,250	12,180	3,136	858,925
Screw-press: 2-press	11,290	132,250	11,110	3,034	872,213
Direct-solvent: Plant 1	7,060	122,740	14,670	3,200	921,282
Prepress-solvent: Plant 2	9,100	122,740	14,670	3,365	1,064,782
	ANNUAL CRUSH: 13,200 TONS				
Hydraulic: 8-press	9,100	132,250	12,180	3,287	911,869
Screw-press: 2-press	11,290	132,250	11,110	3,338	904,082
Direct-solvent: Plant 1	9,100	122,740	14,670	3,531	956,947
Prepress-solvent: Plant 2	9,100	122,740	14,670	3,586	1,086,398
	ANNUAL CRUSH: 21,100 TONS				
Hydraulic: 8-press	11,290	132,250	12,180	3,490	1,027,038
Screw-press: 3-press	13,630	132,250	11,110	3,591	1,100,910
Direct-solvent: Plant 2	11,290	122,740	14,670	3,696	1,210,021
Prepress-solvent: Plant 2	11,290	122,740	14,670	3,807	1,201,585
	ANNUAL CRUSH: 26,400 TONS				
Hydraulic: 10-press	11,290	132,250	12,180	3,692	1,151,764
Screw-press: 3-press	13,630	132,250	11,110	3,692	1,154,871
Direct-solvent: Plant 2	11,290	122,740	14,670	3,807	1,263,992
Prepress-solvent: Plant 3	13,630	153,340	17,170	4,303	1,559,364
	ANNUAL CRUSH: 42,200 TONS				
Hydraulic: 16-press	13,630	162,850	14,550	5,600	1,614,092
Screw-press: 5-press	22,030	162,850	13,030	5,733	1,666,351
Direct-solvent: Plant 3	19,840	153,340	17,170	5,267	1,784,324
Prepress-solvent: Plant 3	19,840	153,340	17,170	5,467	1,766,502
	ANNUAL CRUSH: 52,800 TONS				
Hydraulic: 20-press	19,840	162,850	14,550	7,365	1,882,354
Screw-press: 6-press	26,020	162,850	13,030	7,365	1,883,548
Direct-solvent: Plant 3	19,840	153,340	17,170	6,869	1,923,718
Prepress-solvent: Plant 4	24,920	153,340	17,170	6,267	2,211,621
	ANNUAL CRUSH: 63,400 TONS				
Hydraulic: 24-press	22,030	162,850	14,550	7,945	2,120,526
Screw-press: 8-press	29,510	162,850	13,030	8,358	2,207,043
Direct-solvent: Plant 4	24,920	197,560	21,570	8,110	2,424,223
Prepress-solvent: Plant 4	24,920	153,340	17,170	7,779	2,338,488
	ANNUAL CRUSH: 79,200 TONS				
Hydraulic: 30-press	26,020	207,070	17,990	11,071	2,742,150
Screw-press: 10-press	34,270	207,070	15,370	10,676	2,695,239
Direct-solvent: Plant 4	24,920	197,560	21,570	9,885	2,625,254
Prepress-solvent: Plant 5	29,510	197,560	21,570	9,600	3,139,684
	ANNUAL CRUSH: 105,600 TONS				
Hydraulic: 40-press	29,510	207,070	17,990	15,986	3,368,923
Screw-press: 13-press	42,910	207,070	15,370	15,724	3,346,187
Direct-solvent: Plant 5	29,510	197,560	21,570	14,413	3,178,443
Prepress-solvent: Plant 5	34,270	197,560	21,570	15,200	3,493,544

[1] Averaging 22 24-hour working days per month.
[2] Memphis, Tenn., pricing point except for land.
[3] Includes trucks and autos, vehicle shed, seed sampling building and equipment, office building and equipment, railroad and truck scales, railroad track and switches, and sundry items. Includes fire protection tank for hydraulic and screw-press mills only. Includes facilities for addition of soapstock to meal for direct-solvent and prepress-solvent mills only.

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